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COLEOPTERA
LAMELLICORNIA
PART III.
(COPRINÆ)

BY

G. J. ARROW.

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ALERE FLAMMAM.

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PREFACE.

In the preparation of this volume I have again been fortunate in having been able to examine original types or co-types of a very large proportion of the species. For this advantage I am indebted to the generous co-operation of numerous friends in many lands. Monsieur A. Boucomont, Dr. J. J. E. Gillet, and the late Father Wasmann have kindly sent me, from France, Belgium, and Holland respectively, the types in their own collections of the species described by them. Dr. R. Gestro and his former assistant, Dr. Gridelli, sent me the numerous types contained in the Genoa Museum, Messrs. Severin and Ball those of Lansberge in the Brussels Museum, Dr. Holdhaus those of Redtenbacher in the Vienna Museum, Herr Gebien the Wiedeman types in the Hamburg Museum, and Dr. Heller those of Felsche in the Dresden Museum. Dr. B. Uvarov has procured for me types of Motschulsky from the Moscow University Museum (the remains of this collection are in Moscow, and not, as stated in the preface to my volume on the Endomychidæ, etc., in Petrograd), Professor Poulton has allowed me to borrow those of Fabricius, Castelnau, and Gory in the Hope Department of the Oxford Museum, and to Monsieur René Oberthür I am indebted for the loan of various types of Harold, Bates and Sharp from his collection.

I must also acknowledge the friendly helpfulness shown me by Messrs. Lesne and Bénard in Paris, Dr. Kai Henriksen in Copenhagen, and Dr. Roman in Stockholm, during my visits to their respective museums to examine the types under their charge.

My work would have been much more incomplete than it is but for the persistent efforts of various collectors in India,

for whose practical interest I beg to offer them my sincere thanks. Chief among these are Mr. T. Bainbrigge Fletcher, Dr. Hem Singh Pruthi, Dr. C. F. C. Beeson, Mr. J. C. M. Gardner, Mr. G. M. Henry, Mr. H. G. Champion, and Mr. E. A. D'Abreu.

There is reason to believe that greater accuracy in the citation of localities has been achieved in this than in my previous volumes, and for this the invaluable local experience of the Editor, Lieut.-Col. J. Stephenson, is entirely responsible.

Miss O. F. Tassart has spared no pains to produce faithful representations of the insects figured in the text, as well as in the admirable coloured plate. An innovation will be found in the present volume in the twelve plates of figures photographed direct from the specimens. The photographs have been taken by myself, and each is of the exact size of the insect represented.

Finally, I must acknowledge the assistance of my wife in the concluding stages of the work.

GILBERT J. ARROW.

December 1931.

GLOSSARY OF TECHNICAL TERMS.

Names of parts of the body explained in the diagrammatical figure on p. 13 are not included here.

In the text, ♂ indicates the male, ♀ the female.

Apex, Apical.—The distal or outer extremity of a part.
Asperate (puncture).—A little raised above the general surface on one side.

Bifid.—Forked.

Callus.—A rounded prominence often found near the shoulders and apices of the elytra.
Carina.—A ridge.
Castaneous.—Having the red-brown colour of chestnut.
Cephalic.—Belonging to the head.
Chitin.—The horny substance composing the exterior of an insect.
Clypeo-frontal.—At the junction of the clypeus and forehead.
Compressed.—Flattened in a vertical plane.
Coriaceous.—Having a finely roughened surface.
Costa.—A rib-like elevation.

Decumbent.—Lying down.
Depressed.—Flattened in a horizontal plane.
Digitate.—Bearing several finger-like processes.
Dorsal.—Belonging to the upper surface.

Emarginate.—Excised at the edge.
Excavate.—Hollowed out.

Fascia.—A transverse bar or mark of irregular shape.
Filiform.—Threadlike.

Granulate.—Bearing fine, closely set elevations.

Imago.—The final and mature stage of an insect.

Lamella.—A leaflet of the antennal club.
Lamina.—A thin plate.
Larva.—The primary active stage of an insect.

Metatarsus.—The basal joint of the tarsus.

Opaque.—Dull, not reflecting light.
Oviposition.—Egg-laying.

Piceous.—Black, with a red tinge.
Pubescence.—A clothing of soft hair.
Pulvillus.—An appendage of the last tarsal joint, situated between the claws.
Punctate-striate.—Bearing rows of punctures in grooves.
Punctulate.—Bearing minute punctures.
Puncture.—A small pit or impression.
Pupa.—The penultimate stage of an insect.

Reflexed.—Bent back.
Retuse.—Sloping, as though cut away.
Rugose.—Having an irregularly wrinkled surface.
Rugulose.—Having a more finely wrinkled surface.

Scape.—The first or basal joint of the antenna.
Scutellum.—The part of the mesonotum interposed between the elytra.
Seta.—A short stiff hair or bristle.
Setigerous.—Bearing setæ.
Sinuate.—Having a curvilinear excision.
Striate.—Bearing parallel grooves.
Striate-punctate.—Bearing parallel rows of connected punctures.
Strigose.—Bearing fine, closely set scratches.
Striolate.—Bearing short scratches or linear impressions.
Sub-.—Prefixed to an adjective means almost.
Sulcate.—Bearing strong parallel grooves.
Suture.—The meeting line of two adjacent edges (especially of the elytra).

Tergite.—One of the dorsal plates of the abdomen.
Testaceous.—Having the yellow colour of tortoise-shell.
Truncate.—Ending abruptly, as though cut short.
Tuberculate.—Bearing fine scattered elevations.

Umbilicate (puncture).—Having a central elevation.

Variolose.—Bearing shallow rounded pits.
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INTRODUCTION.

Subfamily COPRINÆ.

It is doubtful whether there is any other large group of beetles which, as a whole, can be pronounced as definitely useful to mankind as the COPRINÆ. Found in almost every part of the world, and in great abundance in most of its warmer regions, they employ themselves everywhere in clearing the ground of offensive matter—a labour the value of which is little realized, just because of the thoroughness and regularity with which it is performed. Generally known as Dung-beetles, the insects would be more accurately described as Scavenger-beetles, some of them feeding upon carrion; and a few upon decaying fungi and other vegetable substances.

In 'A Naturalist in Hindustan,' Major R. W. G. Hingston writes:—"Were it not for Nature's scavengers the East would be the cesspit of the world. Man assuredly would annihilate himself in the emanations from his own filth. . . . But incomparably the chief of this great array are the members of the enormous family of Dung-beetles, the Scarabæidæ. They seek the excrement of men and cattle, gather it into nodules or rounded pellets, and bury it beneath the surface of the soil. Since the greater part of their life is spent hidden in the earth or lodged in the substance of some fæcal mass, they are not obvious to every eye. Nevertheless, they exist in prodigious numbers, and the quantity of refuse which they remove is immense, almost beyond belief. So far as I can estimate by rough observation, I believe that in certain active seasons of the year two-thirds of the excrement of this vast country must be carried by scarabs into the substance of the soil. Without their valuable aid the land would be an open sewer. Remember that it supports a teeming population of some 300 million souls. And, save for the few collected in the cities, the whole of this great multitude of people depends on the work of Nature's scavengers to clear its filth away. I will not enter into numerical details, but, taking

into account human ordure alone, I believe that in India during May and June as much as forty or fifty thousand tons of excrement must be carried by scarabs each day into the soil. And this does not include the dung of animals, which may easily double or treble the amount. It seems an almost incredible number. I advance it with no claims to the strictest accuracy, but I think it gives us a just impression of the incalculable value of this tribe of beetles as the leading scavenging army of the East."

Not a single species of COPRINÆ is known to feed upon living matter or any substance of commercial value. Against their valuable services to us there is very little indeed to be set on the debit side of the account. A few species—*Onthophagus bifasciatus* and *unifasciatus*, and *Caccobius unicornis* and *mutans*—have been found in various parts of India associated with a disorder in young children to which the name of scarabiasis has been given. The beetles make their way by some means into the intestinal tract, but there is no reason to suppose that this is a normal habit of any of the species, and the remedy is to be found in greater cleanliness on the part of the people. Several memoirs have been published on the subject, and a list of them is given by Mr. M. O. T. Iyengar in the 'Indian Medical Gazette,' vol. lxiii, 1928.

Various species of COPRINÆ (*Caccobius*, *Oniticellus*), amongst other insects, have been found in Europe and America to serve as intermediate hosts for parasitic worms of the genus *Gongylonema*, which cause disease in cattle. The beetles, containing the worms in an encysted state, are presumably swallowed accidentally by the cattle when grazing, and the worms complete their development in the body of the second host. *Gongylonema* occurs in man also, but there is no evidence in his case of any association with insects.

In the course of the operations referred to above, the COPRINÆ exhibit a phenomenon apparently very rare amongst insects, and, indeed, amongst any but warm-blooded animals, viz., the co-operation of the two parents in the labour of nidification, a work which is often of considerable duration and complexity. Some highly interesting observations have been recorded by J. H. Fabre and a few later writers relating to the habits of certain representatives of genera belonging to the Indian fauna. A brief résumé of these has been included in the present Introduction.

Another phenomenon which presents itself in a specially forcible manner in connection with the group is that of Sexual Dimorphism. This has been briefly discussed in relation to the groups dealt with in my previous volumes, but in the COPRINÆ strange forms of armature upon head

and thorax occur in astonishing number and variety, and these insects probably offer more abundant materials for the study of the subject than any other group of animals. In any systematic study of the beetles it is of the greatest importance to realize that where these remarkable outgrowths occur, as they do in a large proportion of the species, not only do the two sexes usually differ greatly in appearance, but very different and sometimes unconnected phases may occur in the same sex.

In dealing with insects of the present group it is of more than usual importance to bear in mind the extent to which the outward appearance may be altered by the effects of wear and tear. Not a few supposed species in various groups of insects owe their existence solely to the failure to allow for changes due to this cause, which operates more especially in burrowing insects. The subterranean activities are of a particularly arduous and protracted kind, and it is not surprising that marked differences are visible between those entering upon the labours of their kind and the toil-scarred frames of the veterans. The outer edges of the tibiæ and the front of the clypeus show these effects most plainly, but the whole surface-sculpture is liable to alteration as the result of attrition. Wherever possible, the descriptions in this work have been made from specimens in fresh condition, and the undesirability of describing examples in a worn state cannot be too much emphasized. It is equally important for the proper discrimination of the species, which sometimes differ in the character of the minute sculpturing of the surface, that the specimens should, if necessary, be carefully cleaned before being examined. I have found the best method to be soaking in strong soap and water for a time, followed by the application of clean water with a fine brush. In many cases a microscope will be needed to determine the real character of the surface-sculpture, and a binocular will be found the most useful for the purpose.

A few words may be here added in explanation of the terms used in describing the surface-sculpture. Punctures, which seem to be primarily the points of insertion of hairs, may appear as simple pits, shallow or deep, or the elevation of the central portion may give them an umbilicate or annular form. The elevated portion may be at one side instead of in the centre, producing a crescent-shaped or horseshoe-shaped puncture, or the puncture may appear as if impressed obliquely and partly concealed by a small elevation or granule (asperate puncturation). Finally, the punctures may disappear, leaving the granules alone, or they may coalesce or become interconnected, leaving ridges or close scale-like granules of oval or rounded shape.

Metamorphoses.

As is the case in other groups of Lamellicornia, the egg in the Coprinæ is white, oval in shape, and has the curious characteristic of growing considerably after its deposition, attaining, before hatching, about eight times its original bulk, presumably by the absorption of moisture. In all cases known to us each egg is separately laid in a carefully prepared chamber in proximity to a store of food sufficient for the needs of the young insect during the whole period of immaturity.

In consequence of the lengthy preparations made before the deposition of each egg, the total number laid is very small, in some cases as few as three or four, and probably less than a dozen in general. In spite of this remarkable infecundity, the insects are often very abundant—far more so than other kinds which invariably deposit many hundreds or thousands

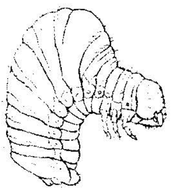

Fig. 1.—Larva of *Oniticellus cinctus*. (After Gardner.)

of eggs. The reason is, no doubt, that the parental care ensures a very l w rate of infant mortality. The immense fertility found in certain animals is an adaptation to extremely precarious conditions of life during immaturity, only a minute percentage having any chance of survival. In the Coprinæ nearly every risk seems to be guarded against. The abundance of the insects proves the efficacy of the parental care, for even a small percentage of failure would entail extinction, so low is the rate of reproduction.

The larva is smooth and naked, and lies upon its side with the body bent, in the characteristic Lamellicorn manner, and the two extremities brought close together. Instead of the usual C-shape of other Lamellicorn larvæ, however, the body is very sharply flexed in the middle, so as to assume more the shape of the letter V. The head is small in proportion to the size, there are no eyes, and the antennæ are exceedingly small, consisting of three joints and a very minute terminal appendix. The mandibles are stout, with acute

tips, the maxillæ consist of two distinct lobes and a 4-jointed palpus, and the labium is stout and fleshy, with very short 2-jointed palpi. In common with most other Lamellicorn larvæ, those of the COPRINÆ possess a stridulatory apparatus, operated by rubbing the maxillæ against the mandibles. Whether this is invariably present is unknown, and what purpose it serves it is also impossible to say. In the genus *Scarabæus* a large space beneath each mandible and at its base is closely set with minute tubercles, and the basal part of the maxilla, where it is in contact with this part of the mandible, bears a row of strong curved spines. Friction between these two sets of horny excrescences no doubt produces sounds of some kind. I believe there is no record of its nature, although larvæ belonging to other Lamellicorn groups have been heard to produce sounds by similar means.

The three thoracic segments are short, and bear three similar pairs of short legs, which are of no use for locomotion. The first two abdominal segments are successively a little larger, but the third and following segments are very large, producing a hump-backed form which is the most marked characteristic of the subfamily. The hump becomes more prominent as growth advances, and is occupied by the voluminous intestine. Th posterior end of the body is obliquely flattened.

The growth is rapid; according to Lefroy the larval life of an Indian *Onthophagus* lasts 21 days, and in *Oniticellus pallipes* the larval and pupal stages together occupy only about 19 days. The intestine retains the whole of its contents until the larva has completed its growth. A pupal cell is then formed of matter ejected for the purpose and moulded, with the assistance of the mandibles and the broad, flat, posterior end of the body, into a smooth oval envelope. The remaining contents of the alimentary canal having been plastered smoothly over the interior of the cocoon, the insect exchanges its former dirty-brown colour for a pure glistening white, and is ready to assume the pupal form. In some species of *Onthophagus*, and perhaps in all, the pupa assumes an inverted position, and a process which makes its appearance at this stage upon the dorsal surface of the thorax forms the only point of contact with the floor of the cell. This process and the tip of the tail alone appear to support the pupa in this curious position, leaving free space everywhere for the expansion of the soft and delicate imago at the critical time of its emergence from the pupal skin. Whether the thoracic process corresponds with the dorsal horn carried in the same position by adults of some species of *Onthophagus*, e. g., *O. imperator* and *gladiator*, remains to be ascertained. These horns are sexual in their occurrence. In the two

species mentioned they are distinctive of the male, and in *O. sagittarius* the female alone has a thoracic horn. It would be of great interest to examine the pupæ of these species. In those species of which the pupa is known the pupal horn disappears, leaving no trace in the adult beetle.

After attaining maturity, the beetles may find themselves imprisoned for some time in their subterranean cells before the ground is sufficiently penetrated by rain to make possible their emergence into the upper air and light. The nests of some of the larger forms are found as much as 6 or 8 feet below the surface of the ground, and the cells of some of them are enclosed by the parents in a thick outer layer of clay, which becomes so hard that those first discovered were supposed to be ancient stone cannon-balls. The ball of a *Heliocopris* which I have examined is 4 inches in diameter, and has a hard outer crust of clay varying from half to nearly one inch in thickness. So enclosed the insects are able to remain for long periods in a state of suspended animation. A specimen of *Heliocopris gigas* emerged 16 months after the finding of the ball containing its pupa, and, according to M. Sijazov, *Synapsis tmolus*, although it finishes feeding and prepares its pupal cell during its first summer, does not reach maturity until the end of a second summer, and does not emerge until the spring of the third year.

HABITS.

The curious habits of some of the COPRINÆ have attracted attention since the dawn of civilization, and perhaps before, and the carved and modelled representations of the Scarab preserved in such abundance from ancient Egyptian times constitute almost the oldest entomological records in existence. The insect usually represented, and called by Linnæus *Scarabæus sacer*, from its connection with the Egyptian religion, extends its range from the Mediterranean to India, and it or other species of *Scarabæus*, with various representatives of the nearly related genus *Gymnopleurus*, may be seen in most parts of India engaged in their occupation of ball-rolling. To this strange habit, and the wonder and speculation aroused by it, is due the signal honour paid them by the ancients. It is only in recent times that the actual procedure has been studied with care and the true facts ascertained. This, together with most of the little that is known of the remarkable instincts and life-histories of these beetles, is due to the French naturalist, J. H. Fabre. Amongst the vast number of forms whose habits are still unstudied, it can hardly be doubted that there are many possessing even more elaborated instincts than those of the few of which a little has been discovered.

As to the habits of the ball-rolling genera, *Scarabæus* and *Gymnopleurus*, Fabre's account has been supplemented by the description of certain Indian species given in Major R. W. G. Hingston's interesting book, 'A Naturalist in Hindustan.' The method of operation is, in the main, the same with all the numerous forms of the two genera. A quantity of dung is separated from the mass by means of the head and fore-legs and gathered beneath the body, where it is pressed together between the legs and rapidly acquires a spherical shape. This operation takes only a few minutes, and as soon as it is finished the insect proceeds to roll the ball away by pushing it backwards. The long hind legs encircle it, shifting their position continually as it rolls, while the fore-legs and the toothed front edge of the head are pressed against the ground and maintain the backward movement, in spite of all mishaps. The actual purpose of this operation is unknown. The idea, which long prevailed, that the ball contained an egg at its centre, and that the rolling process was in some way necessary for its due development, was shown by Fabre to be wrong. In most cases the ball is prepared for the beetle's own consumption, and, provided it is not taken from its owner by some other individual, as often happens, it is eventually propelled to a suitable spot, the earth beneath it is scraped away until ball and beetle disappear underground, and it is then consumed at leisure.

But the ball may be intended for the food of the future young, and in that case a much more elaborate routine is followed, differing in its details according to the species. In all cases, however, a roomy chamber is excavated underground, and into it is conveyed either the already prepared ball or the material from which it is to be modelled *in situ*. The operations are generally performed entirely by the female beetle, but the male appears sometimes to take some part in them. Generally the chamber is designed to lodge only a single grub, but in the European *Scarabæus laticollis* the ball, after being introduced into the chamber, is divided into two equal parts, each of which is then carefully moulded into a perfect sphere. In preparation for receiving the egg, a saucer-shaped depression is first made in the sphere, with a flange all round it. The egg is laid in the middle of this and the flange is then pressed round it, the edges coming together above it, but leaving an ample air-space. The sphere is now converted into a pear-shaped object, the apex of which, although completely closed, is of a looser texture than the rest, so that the enclosed cell, although protected against the danger of desiccation during summer heats, is not quite without ventilation. On leaving the chamber the beetle closes it with some of the earth dug from it.

Having first increased considerably in size, the egg in a few days hatches, and the young larva at once proceeds to devour the substance of its cell, attacking it always at the thickest part, and leaving the outer crust intact. Should a crack or breach accidentally occur in this, the insect immediately repairs it by exuding from the intestine a sufficient quantity of rapidly solidifying fæcal matter, applied to the breach by the flat extremity of the body. This power of executing any necessary repairs is no doubt very important, for if the grub should fall out of its cell it must inevitably perish, its powers of movement being so slight that it would be quite unable to regain it. In the hot climates in which these insects flourish most, the crust of the cell, becoming constantly thinner, must be very liable to crack.

The amount of food provided is sufficient to enable the grub to grow to its full size, and the cell, having been completely hollowed out, is first strengthened by receiving a coating of cement inside from the contents of the intestine, rendering it exceedingly hard. Within it the insect then assumes, first the pupal, and, after about four weeks' interval, the adult stage. On completing its development it is necessary to wait until wet weather has softened the ground as well as the enclosing shell. It can then burst this and make its way at last to the light of day.

Some, at least, of the species of *Gymnopleurus* differ in their habits from the species of *Scarabæus* in working in pairs instead of singly. One beetle is found pushing the ball from behind, its head downwards, and a second, in front, pulls the ball, which it grasps with its four anterior legs, the hind pair resting on the ground. The method of operation has been carefully observed and described in the case of *G. miliaris* by Major R. W. G. Hingston in his book, 'A Naturalist in Hindustan.' In another species, *G. sinuatus*, Mr. H. Honda carried out a careful investigation in Manchuria in order to ascertain whether the collaborating beetles were always of different sexes. He collected 67 pairs taken in the act of ball-rolling, and by dissection found that in every case the pusher of the ball was a female and the puller a male. He found, also, that when the proper moment arrived the female went off in search of a suitable spot in which to bury the treasure, while the male remained in charge of it. Mr. Honda also believes that when, as so often happens, another individual attempts to seize the prize, the assailant, if a male, is opposed by the male proprietor, and, if a female, by the female. If the robber succeeds he simply takes the place of his defeated opponent, the ball rolls on again, and all proceeds as if no interruption had taken place.

In the genus *Sisyphus*, whose long-legged, spider-like

members are equally agile upon the wing and on the ground, the two sexes, according to Fabre, co-operate in a similar way. Prof. Maxwell Lefroy states, in 'Indian Insect Life,' that the tiny *Sisyphus longipes* has been observed to roll its ball, twice the size of itself, for 100 yards, two individuals usually taking part. The three genera mentioned seem to be the only ones found in Europe and Asia which have the ball-rolling habit. Probably all the COPRINÆ perform more or less prolonged and complicated operations in providing for their offspring, but the whole of these operations being, in the great majority, hidden from view, their details are quite unknown to us.

The only other genus occurring in India the habits of any species of which are known with any approximation to completeness is the genus *Copris*. The two European representatives of this, *C. hispanus* and *lunaris* (of which the former is also found in India), were studied by Fabre, and nearly-related Indian forms, such as *C. iris*, *magicus*, and *sarpedon*, will probably be found to have very similar habits. In this genus parental care reaches the highest point known as yet in the COPRINÆ. The two parents work in collaboration, and their labours are of considerable duration. A sloping shaft is first dug a few inches into the ground, and at its foot is excavated a spacious chamber with level floor and domed roof. The digging is performed by the female, while the material excavated is collected by the male and ejected at the top of the shaft. The two sexes in the species mentioned are very easily distinguished by the curious armature of the male.

The chamber having been completed, the male proceeds to collect the dung, which he brings, a small quantity at a time, to the female, by whom it is kneaded into a mass of uniform consistency. When the chamber is so far filled as to leave little more than sufficient room for the two beetles to move round it freely, the next stage is begun. A segment of the proper size is separated from the mass and shaped into a ball by the same methods as are employed by *Scarabæus* and *Gymnopleurus*, and the ball finally becomes pear-shaped, with an egg-cell, containing its single egg, at the apex. The operation is then repeated until a clutch of half a dozen or less of the pear-shaped brood-cells fill the nest. During the following weeks, while the invisible progeny are developing, the mother, and in some cases both parents, remain in the nest, finally leaving it only when the young have reached maturity and are ready to emerge also. In the larger European species, *Copris hispanus*, the brood numbers no more than three or four, and it seems likely that a second brood may be produced by some of these beetles in the following year.

It has been stated by M. Sijazov that in Turkestan *Copris hispanus*, after excavating its underground chamber and storing it with the food-material, only in rare cases uses it as its nest, but normally sinks a shaft from it, and at the end of this forms a second chamber, at a depth of over two feet from the surface, in which the brood is established.

Of the habits of the numerous Indian species of *Copris*, *Catharsius*, and *Heliocopris* there is no record, but the larval cells of more than one species of the last genus are known. According to the late Prof. Maxwell Lefroy, some of these have been found as much as 8 feet from the surface of the ground. They are not pear-shaped, but globular, and are coated outside with a thick layer of hard clay. Those of *Heliocopris gigas*, on the average the smallest of the four Indian species, are 2 inches in diameter, and those of *H. dominus* and *H. tyrannus* twice as large. Mr. C. C. Ghosh has stated that in the Shan Hills the balls of *H. bucephalus* are found in groups of from seven to twelve, and are collected by the natives for the sake of the pupæ, which they regard as delicacies.

As to the habits of the curious genus *Synapsis*, we have only some notes by M. Sijazov upon *S. tmolus* in Turkestan. The two sexes are said to excavate a primary and a secondary chamber like *Copris hispanus*, the brood-chamber being about 6 feet from the surface of the ground and from 6 to 9 inches in height and breadth. The primary chamber is first stored, and the material is afterwards transferred to the deep chamber, where it is moulded into the larval balls, the usual number being two, three, four, or five, but occasionally as many as seven being found.

Another common genus in India is *Onitis*. The European representative of this, *O. belial*, was said by Fabre to dig a shaft with several short branches at the foot and to store the branches with the food-material, each branch forming, as in *Geotrupes*, the cradle of one larva ; but according to M. Chobaut this is incorrect, and this insect makes a single large chamber after the manner of *Copris*, and no doubt fills it with similarly modelled larval cells.

The great genus *Onthophagus*, which is found in every part of the world, and whose species outnumber all the rest of the subfamily, has very various ways of life, although the recorded facts are as yet very few and fragmentary. No collaboration between the two sexes was discovered by Fabre in half a dozen species observed by him, but the only one upon which observations have been made in any detail is the European *O. taurus*. Excellent photographs of the larva and pupa of this in its cell have been published by Mr. Hugh Main in Proc. Ent. Soc. Lond. 1922, and a description is contained in vol. x. of

Fabre's 'Souvenirs.' An irregular cavity is dug by the female beneath a mass of dung and the walls first plastered with a cement, the method of preparation of which is unknown. At one point a roomy cell is partitioned off and an egg attached by one end to its wall; the remainder of the cavity is then filled with food carried down from above, for the larva, and the entrance plugged with earth. According to Ohaus, the operation is repeated from four to six times.

All the COPRINÆ mentioned so far are dung-feeders, but there are many which are carrion-feeders, either occasionally or exclusively, and some content themselves with vegetable substances in a state of decomposition. In America, where indigenous herbivorous mammals are almost absent, many of these beetles feed upon carrion and store it for their larvæ, making it into balls and pear-shaped cells in their subterranean caves, and in some cases rolling pellets of it over the ground. Luderwaldt has enumerated many Brazilian species of carrion-feeders, including representatives of all the principal American genera, *Phanæus*, *Pinotus*, *Canthon*, *Deltochilum*, etc. Many members of the genus *Onthophagus* in both hemispheres are also carrion-feeders. The late Prof. Maxwell Lefroy found more than one species of the genus engaged in the central plains of India in destroying dead locusts, which were there in great numbers. *O. bifasciatus* has been found feeding upon a dead locust and a dead snake, and several species have been recorded as taken in dead lizards. Some show a marked predilection for a particular kind of carrion. In South Africa Dr. (now Sir) G. A. K. Marshall found that *O. præstans* sought out and rolled away the dead millipedes found lying upon the ground after the rains, while another species of the genus could always be attracted by a dead snail. In Florida, *Onthophagus polyphemi* is found in the burrows of a tortoise, and another North American species, *O. cynomysi*, inhabits those of the prairie dog. Others in various parts of the world are always found in fungi. Mr. Arthur Lea has found the Australian *O. dunningi* to occur solely in agarics, and I have here named an Indian species of similar habits *O. agaricophilus*. Mr. E. Jacobson has informed me that *O. deflexicollis*, another Indian form, is found in vegetable mould and especially in the detritus which accumulates under the sheaths of bamboo stems. Dr. Ohaus has found two genera of South American COPRINÆ, *Aphengium* and *Bdelyrus*, similarly living upon the vegetable mould accumulated in the leaf-bases of Bromeliads, and some of the numerous species of the American genus *Canthon* are also believed to be vegetarian, being invariably found upon leaves, fresh or fallen. Luderwaldt records that *Pinotus ascanius* feeds upon fallen fruits in South Brazil.

Finally, a number of the smaller and more aberrant forms of COPRINÆ are inhabitants of the nests of ants. *Anoctus myrmecophilus* was found by Mr. H. L. Andrewes in the nest of a harvesting ant (*Pheidologeton diversus*) in the Nilgiri Hills, where it appears to feed upon the debris collected near the entrance to the nest. *Ponerotrogus annandalei* was found by the late Dr. N. Annandale in nests of another ant, *Ponera tesserinoda*, beneath stones, and it is probable that *Haroldius* and other peculiar Indian genera have similar habits. Where and how the larvæ of these various forms of exceptional habits live we are as yet entirely ignorant, for no more than two or three Indian COPRINÆ altogether have been identified in this stage.

STRUCTURE OF THE IMAGO.

The distinctive features in the anatomy of the COPRINÆ seem to have been acquired as adaptations to their characteristic habit of fabricating and burying (either before or after fabrication) balls of food-material for themselves or their young. Many of their features, such as the large shovel-like head and eminently fossorial legs, they have in common with the APHODIINÆ and other related groups, from which they differ most markedly in the very peculiar position of the middle pair of legs. These are very widely separated, and their coxæ are not, as usual, simply interposed between the meso- and metasternum, but have become longitudinal in position and project far back into the metasternum, throwing the point of attachment of the femur much farther back than usual. This is accompanied by a great development of the metasternum, carrying the hind legs also far back. A considerable mass of dung can thus be held between the legs and compressed into the required globular shape while being revolved by them. The longitudinal position of the middle coxæ seems to enable the middle tibiæ to exert pressure in the opposite direction to that of the hinder pair, so maintaining a grip of the sphere and leaving the front legs free for its manipulation.

Head.—The head has always a rather broad and flat upper surface, suitable for shovelling the materials with which the insects have to deal. The clypeus not only overhangs the mouth in front, but is supplemented at the sides by flat lateral lobes which are sometimes called the genæ, but which are here referred to as the ocular lobes. The junction of these lobes with the clypeus is always indicated by a suture or ridge, and they may be produced forward as sharp anterior teeth or continuous with the clypeal margin. These lobes traverse the eyes externally, dividing them into two portions, upper and lower, which may be almost, though never quite,

completely separated. By far the larger part is always beneath, and the upper part is often reduced to a very narrow and inconspicuous strip enclosed between the ocular lobe and the posterior part of the head and level with the surface of the head. The junction between the clypeus and the forehead may be marked by a carina, long or short, or this may be more or less obliterated, but the surface-sculpture of the two regions very frequently differs, and is stronger

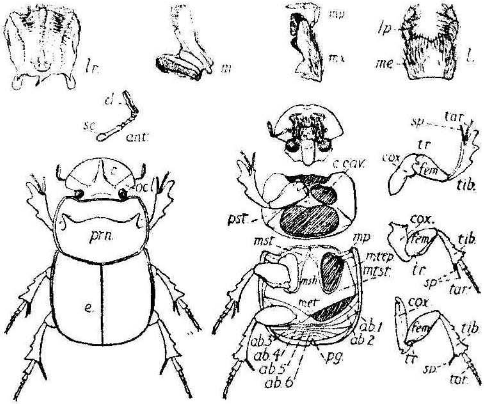

Fig. 2.—*Catharsius molossus* and details of the body:—*ab.*, abdominal sternite; *ant.*, antenna; *c.*, clypeus; *c.cav.*, coxal cavity; *cl.*, club; *cox.*, coxa; *e.*, elytron; *fem.*, femur; *l.*, labium; *lp.*, labial palpus; *lr.*, labrum; *m.*, mandible; *me.*, mentum; *mp.*, mesothoracic epimeron; *mp.*, maxillary palpus; *msh.*, metasternal shield; *mst.*, mesosternum; *mtep.*, metathoracic episternum; *mtst.*, metasternum; *mx.*, maxilla; *oc.l.*, ocular lobe; *pg.*, pygidium; *prn.*, pronotum; *pst.*, prosternum; *sc.*, scape; *sp.*, tibial spur; *tar.*, tarsus; *tib.*, tibia; *tr.*, trochanter.

and closer upon the clypeus than upon the forehead. The shape of the clypeus varies very greatly, and its front margin may be rounded, straight, excised, or produced into one, two, three, or four teeth or lobes. It is particularly liable to differ in shape according to sex, and either the clypeal margin, the ridge separating clypeus and forehead, or the posterior margin of the head may give rise in the male to horns or horn-like outgrowths.

Antennæ.—The antennæ are small and very short. They are attached close to the front edge of the lower portion of the eye, and can be laid back in a groove between the eye and the mouth, so that they are concealed beneath the head when not in use. They consist of only eight or nine joints instead of the normal ten of other Lamellicornia and eleven of most other beetles. The first joint, or scape, is a comparatively long one, and is followed by a small globular one; the third is usually rather longer, the next two or three exceedingly short and compact, and the last three form the small club. These differ to some extent in their shape and relation to one another, but are always short; occasionally the first of the three forms a hollow cup into which the two succeeding joints can be withdrawn (*Onthophagus vultur*, etc.), but more commonly the joints are alike, and simply placed side by side. It is remarkable, in view of the striking differences in other respects so often occurring between the sexes, that the antennæ do not exhibit the sexual differences of development so commonly found in other Lamellicorn groups. In the only two species known to me in which a special development apparently peculiar to the male occurs (*Onthophagus igneus* and *egregius*) the female is quite unknown, probably because it has peculiarly sedentary habits. The first is an Indian species, of which I have seen numerous male examples. In these the antennal club is large, and, seen from beneath, the goblet-shaped first joint almost completely conceals the second, while the third has tbe appearance of a hollow lid or cover. *O. egregius* is a Bornean species with a similar but more remarkably developed club, the last joint having a very complex many-lobed form. Special developments in the antennæ are usually peculiar to the male, and frequently indicate sluggish habits in the female. That they are so exceptional in the COPRINÆ is, perhaps, evidence of the equal activity of the two sexes.

Organs of the Mouth.—The organs of the mouth show the soft nature of the food. The labrum is a thin membrane lying close to the roof of the mouth and covered with short spines curiously arranged. The terminal part of the mandible is not, as usual, designed for biting, but is reduced to a thin translucent membrane, more or less rounded at the end, where it carries a rather coarse brush or pad of long hairs. The basal part is hard and chitinous, and a very hard rounded process upon one exactly fits a corresponding hollowed process upon the other, constituting the masticatory apparatus. The two opposed surfaces bear fine transverse grinding ridges, produced at the inner end into a comb composed of perfectly regular hard teeth set very close together. The inner edge of the mandible is finely fringed with very close short hairs,

forming a continuation of the terminal brush, but generally abruptly demarcated from it. The maxillæ also are incapable of biting, and without teeth, having at their extremity two fleshy lobes closely covered with short hairs, and carrying externally a rather long four-jointed palpus, with a slender and pointed terminal joint. The outer lobe may be small and narrow (*Scarabæus*), or large, transverse, and rather semicircular in shape (*Onthophagus*). The labium shows more disposition to differ in different genera than the other organs of the mouth. It is generally clothed with very long stiff bristles, which render it difficult to discover its precise form. There is a very soft ligula, composed of two widely separated lobes, and a hard mentum, sometimes also bilobed but varying considerably in shape. The labial palpi are peculiar, generally also very bristly and of flattened shape, the two basal joints sometimes very much dilated, the last joint sometimes extremely minute and generally much smaller than those preceding it, sausage-shaped, and free from the bristles clothing the others. In a few genera (*Delopleurus*, *Paraphytus*) the three joints are of similar size and shape.

Prothorax.—The head fits closely into the prothorax, and in *Synapsis* there is even a contrivance for locking together the posterior angles of the former and the front angles of the latter. Occasionally the thorax has well-marked hind angles, but usually the lateral margin meets the basal margin without forming a distinct angle.

Scutellum.—A peculiar feature of the subfamily is the usual absence of a scutellum or exposed part of the mesonotum, which is almost always found in other Coleoptera interposed between the elytra at their base. When present, as in *Oniticellus, Liatongus,* and a few other genera, the scutellum is very small, and in by far the majority of the species it is entirely wanting.

Elytra.—The elytra generally curve gently round the body at the sides, but they may be sharply bent under, forming epipleural folds, which in *Synapsis* and *Phacosoma* are wide. Occasionally they do not completely cover the sides, which are visible from above, as in *Oniticellus*. In *Gymnopleurus*, while covering the body behind, they have the appearance of being cut away at a little distance from the shoulders, so that the base of the abdomen and the epimera of the metasternum are exposed. This seems to facilitate the more immediate spreading and furling of the wings. Each elytron has usually six complete dorsal striæ; a seventh, which is incomplete at the base and begins below the shoulder prominence, is generally present, and there may be one or two, generally incomplete, lateral striæ besides. The epipleural carina, when present, is usually close to either the 7th or 8th stria, and may efface it.

Although sometimes simple grooves, the elytral striæ, especially in the genus *Onthophagus*, sometimes assume a peculiar form. They appear to form double lines, being shallow, but not very narrow, furrows, with a fine raised margin on each side. They may be interrupted by punctures of greater diameter than themselves, producing the appearance of links in a chain, or short transverse strokes may take the place of punctures.

Prosternum.—The prosternum is little developed, the front coxal cavities being always close together and divided only by a thin septum. The coxæ project far from their sockets, and are in contact, or almost so. No production of the prosternum in front or behind is usual, but an extension or thickening occurs behind the coxæ in *Oniticellus*, and is especially well developed in *Liatongus rhadamistus*. In two African species of *Onitis* the males only have a very extraordinary forked prolongation of the prosternum behind.

The sides of the prothorax beneath may be divided by an oblique ridge which extends from the margin of the coxal cavity to the outer margin, and in *Caccobius* and some species of *Onthophagus* and *Copris* the anterior division lying beneath the front angles is hollowed. In certain species of *Synapsis* (e. g., *S. birmanicus*), a similar hollow is found, but here it is masked by a curious arrangement of long hairs springing from its margin and directed towards the centre. It is remarkable that in another species of the same genus, *S. ovalis*, this feature is absent from the prothorax, but appears in an exactly similar form upon the side-pieces (epimera) of the mesothorax. Its function is quite unknown.

Mesosternum.—The mesosternum is short and consolidated with the metasternum, the junction being usually indicated by a fine ridge, sometimes straight and sometimes curved or angular. It may be concealed by the prosternum, as in *Liatongus rhadamistus*.

Metasternum.—The peculiar position of the middle coxal cavities results in the division of the metasternum into three portions, which I have called the metasternal shield and sides.

Abdomen.—The elongation of the metasternum entails a corresponding shortening of the abdomen, which, even in long-bodied forms like *Oniticellus* and *Paraphytus*, is very short relatively. It consists of six † externally visible sternites very closely attached, and capable of little or no movement except at the base. In at least one species

† In the diagrammatic figure of *Scarabœus sacer* in the Introduction to the Lamellicornia in Part I of this series (p. 6), the sternites are numbered from 2 to 7, a very small part of an anterior one being sometimes visible; but for the sake of simplicity I here treat the first external sternite as the first and the last as the sixth.

(of *Drepanocerus*) the solidification is almost complete, and the lines of junction of all but the last two segments have become entirely obliterated. The last abdominal tergite, the pygidium, is always large and exposed, and either vertical or inclined a little inwards. In *Paraphytus* it is so much inclined as to form part of the ventral surface. Along each side of the abdomen there is usually a line coinciding with the outer edges of the elytra, and this line is normally continued across the pygidium in the shape of a sharp ridge, which may easily be mistaken for the anterior margin of the segment, especially as the surface-sculpture generally changes abruptly at this point. In a few species of *Onthophagus* (*O. tarandus*, *pusillus*, etc.) the ridge is absent.

The abdominal spiracles are placed in the connecting membranes between the tergites.

Organs of Stridulation.—Stridulatory areas occur upon the abdomen in certain genera. They are of two different types, one ventral and the other dorsal, and these must have arisen independently, although they are found in nearly related genera. The first type occurs in the genus *Heliocopris*. If the abdomen is removed from a dead example of this genus it will be seen that its anterior part, forming the posterior wall of the socket in which the hind coxa revolves, is exceedingly hard and smooth, and under the microscope the inner part of it can be seen to be marked with extremely fine and close transverse ridges. The rounded surface of the coxa, where it is in contact with this wall of the cavity, is rough and hairy; but close to the inner margin it becomes abruptly smooth and bare, and here the microscope reveals a small area covered with minute regular ridges similar to, and having the same transverse direction as, those upon the opposed surface of the socket. A squeaking sound can be produced, even in a dead specimen, by moving a hind leg so that these two ridged surfaces are made to rub one against the other, and the late Dr. N. Annandale has described the squeak of a living specimen as like that of a bat.

The hairy clothing of the coxa evidently serves to exclude dust from the cavity and so ensure a perfect contact of the stridulatory surfaces. In another genus, *Synapsis*, the coxal cavity is finely ridged, as in *Heliocopris*, and the corresponding surface of the coxa is finely corrugated, but without any specially fine and regular ridges. The hairs have not disappeared entirely from the inner portion, but are reduced to exceedingly short rigid spines, lying almost flat and pointing forward, which apparently serve to set up the vibrations. As might be expected, the effect of producing friction between the parts is a much harsher and less musical sound than that of *Heliocopris*.

In the genus *Copris* the apparatus is found upon the dorsal surface of the body. A small area upon the third tergite from the end is provided with fine, closely set, transverse ridges which, by the expansion and contraction of the back, are made to rub against corresponding ridges upon a prominent rib on the under surface of each elytron close to its inner edge. To secure rigidity the edges of the two elytra interlock, and they are also held in position by a groove in the tergite immediately behind that bearing the stridulatory ridges. The sound produced by this apparatus has been described in the case of the British representative of the genus, *Copris lunaris*. A similar apparatus exists in *C. confucius* and other Indian species, but not in all.

Wings.—Being accustomed to locate their food-material by scent the COPRINÆ are in general strong and ready fliers. Certain genera (*Gymnopleurus*, *Oniticellus*), instead of having the elytra bent round the sides of the body in the usual way, have the lateral part reduced to facilitate the instant slipping out of the wings for flight and their immediate sheathing on alighting. A few peculiar genera, however, of which one, *Disphysema*, is Indian, are without wings, and the elytra have undergone a corresponding reduction, together with the rounding off of the shoulders which always indicates the wingless condition. The genera *Mnematium* (*Pachysoma*) in South Africa and *Glyphiderus* and *Eucranium* in South America are also wingless.

Legs.—The legs have great muscular power, more especially the front pair, which are the essential digging implements. These are always short, except in the males of certain species, which differ from the females in that respect. In those genera which consist of ball-rolling species, the four posterior legs are long, sometimes in striking contrast with the short fore-legs. The femora show little variation, but may present one or more teeth at their lower edges. A small patch of glistening silky hairs often seen upon the anterior face of the front femur is found in various other Lamellicorn groups, but its significance is unknown.

The front tibia is provided upon its outer edge with strong teeth, generally four in number, but occasionally only three (*Gymnopleurus* and certain species of other genera), and above the teeth, and sometimes also between them, the edge may be finely serrate.

The digging powers of the ball-rollers, in which the posterior tibiæ are slender, are sufficient only to enable them to deal with fairly loose soil or sand and to excavate shallow burrows. In most other genera the middle and hind tibiæ form auxiliary digging instruments, and make much more extensive burrowing possible. The tibiæ are comparatively short, increasing in

thickness from base to extremity, where they are widest, and so well fitted for shovelling away the materials excavated by the fore-legs. All the tibiæ bear terminal spurs, two each upon the middle pair and one upon each of the others, except in *Scarabæus* and *Gymnopleurus*, where all are single-spurred. In these two genera the spurs are completely soldered with the tibiæ to give a firmer hold in the operation of rolling. The tibiæ generally bear stiff hairs or bristles at their extremities and along the inner and outer edges, and in *Scarabæus* there are close and conspicuous fringes, sometimes four in number, upon the hind legs.

Tarsi.—The front tarsi throughout the COPRINÆ are of rather feeble development, and probably of little use, and in two of the genera occurring in our region, not very nearly related to one another, viz., *Scarabæus* and *Onitis*, they are actually absent in the mature insect. This disappearance of the front tarsi is the most remarkable anatomical phenomenon met with in the group, and one not known elsewhere amongst the Coleoptera. It is not correlated with special habits, for of the two closely related ball-rolling genera, *Scarabæus* and *Gymnopleurus*, the tarsi are absent in the first and present in the second; while they are absent in *Onitis*, which is not a ball-roller, but has habits similar to those of *Copris*, with a full equipment of tarsi. Another curious fact is that in the genus *Chironitis* the front tarsi are absent in the males but present in the females, although so minute as to be little more than vestiges. It would, perhaps, be nearly correct to regard these members as in process of disappearance in the COPRINÆ generally, a process which, from unknown causes, has been accelerated in certain cases. In a few strange African and American genera, *Dendropæmon*, *Pinacotarsus*, and *Heteroclitopus*, not only have the front tarsi disappeared, but only rudiments remain of those belonging to the other legs.

In the ball-rolling genera, *Scarabæus*, *Gymnopleurus*, and *Sisyphus*, the tarsi are simple and filiform, and, except in the last, which has a long basal joint, the first four joints are nearly equal. In most of the other genera of our fauna the middle and hind tarsi are a little flattened, and taper from the base to the extremity. The basal joint is rather long, the second considerably shorter but longer than the third, while this again is longer than the fourth; the fifth is fairly slender. The inner edges of the joints are closely fringed, and the outer edges less closely.

In a small group of genera which I have called the PANELINI, consisting almost entirely of insects of very small size, and including the smallest known COPRINÆ, the tarsal joints are of nearly equal size, all short and without fringes. Several

of these (*Ponerotrogus* and *Haroldius*) are inhabitants of the nests of ants, and probably others have similar habits at present unrecorded.

The claws are simple and symmetrical, and normally rather minute. In some American genera (*Phanæus, Eucranium, Glyphiderus*) they are absent. In a remarkable Australian genus, *Macropocopris*, the members of which have acquired the habit of clinging to the fur of kangaroos, the claws are enlarged and have a deep cleft near their base. In all the Indian genera claws are present, but small and simple in form. There is no pulvillus such as is found between the claws in other Lamellicorn groups, but the end of the claw-joint sometimes extends between their bases, and the extension may form a sharp spine, as in *Catharsius*.

Horns and Secondary Sexual Features.

Of all animal groups the Coprinæ probably exhibit in the greatest number and variety the horns and similar outgrowths, generally distinguishing the male sex, which may be conveniently, although perhaps not very accurately, called the armature. Two other large groups of Lamellicorn beetles are conspicuous in a similar way, viz., the Lucanidæ (Stag-beetles) and the Dynastinæ; but in the former the armature is almost exclusively of one type, consisting in the great development of the mandibles of the male, and in the latter, although in a few species which are amongst the largest of living insects it attains a rather greater development than is to be found in the Coprinæ, the total number of armed forms is much less than in that group. In the Dynastinæ the horned species are almost confined to those above the average size, but the Coprinæ are peculiar for the multitude of small, even tiny, forms in which curious and varied armatures are to be found.

Such armatures sometimes occur in the females, but, with few exceptions, they are most highly developed in the males, and in most cases the female is either quite without or has only slight vestiges of them.

Although the most striking and exaggerated forms of armature take the shape of horns upon the head and thorax, the phenomenon appears in many other forms. Outgrowths of a similar kind may make their appearance upon almost any part of the body. Greatly enlarged mandibles are found exceptionally in males of many groups besides the Stag-beetles, and horny outgrowths occur upon the mandibles in *Lethrus*, the snout in *Cratosomus*, the prosternum in *Chironitis*, the metasternum in *Pedanus*, the abdomen in *Ancistrosoma*, the elytra in *Spathomeles*, the legs in *Sisyphus*, *Plectrone*, and many other genera.

In males of various species of the Coprid genus *Sisyphus* teeth or spines may appear upon the hind femora, the middle femora and tibiæ, or in some cases upon the trochanters of the hind legs. The genus *Onitis* also has teeth upon the legs, generally the middle pair, but sometimes upon the hind femora. In *Chironitis* occurs a remarkable process upon the prosternum behind the front legs, and in this genus another very remarkable sex-difference is the presence of front tarsi in the females only. The terminal spur of the front tibia is also liable to a special development in some male COPRINÆ. In *Gymnopleurus* this is often bifid. In *Onthophagus pollicatus* it is clubbed in the male and acute in the female, and in *O. pactolus* it is straight in the male and bent in the female. In the former species there is also a curious hollow at the base of the abdomen of the male.

A frequent difference between the two sexes is found in the front legs, and especially in the tibiæ. In the female these serve not only for walking, but also for digging, and they are therefore almost invariably short and broad, with strong external teeth set close together; but in the males of many species, particularly in the genera *Onitis* and *Onthophagus*, these limbs are more or less elongate, with the teeth shorter and blunter and set at a distance from one another, so that their efficiency both for walking and for digging seems to be impaired. The tibia usually also acquires a strong curvature. This modification of the fore-legs appears to be designed to form a clasping apparatus for the retention of the female, and the toothed middle legs in *Onitis* and *Sisyphus* perhaps serve the same purpose. In a few extraordinary beetles of exceptionally large size, *Acrocinus longimanus* (the Harlequin-beetle) and the species of *Euchirus* and *Propomacrus*, the male fore-legs have reached such an extreme degree of elongation that it is difficult to imagine them serving any useful purpose at all.

It is remarkable that the antennæ, which in other groups of Lamellicorn beetles, as in Coleoptera generally, are especially liable to show a greater development in the male, show practically none in male COPRINÆ. These organs are the seat of the olfactory sense by means of which insects locate not only their food-material but also other member of their species, and, as the male is usually the more active and seeks out the female, a special development of the antenna is commonly found in the male sex. In the COPRINÆ, both sexes of which usually seek their food on the wing, there is generally no difference in the activity of the two sexes. As already mentioned, I have found especially developed antennæ in only two species, both belonging to the genus *Onthophagus*, and in neither is the female known. It is probable, therefore, that these two species have quite peculiar habits, the females

being inactive, perhaps even entirely subterranean and wingless, requiring organs of exceptional sensitiveness in the other sex for their detection. One of the two is Indian, *Onthophagus igneus*, the males of which are not very uncommon, but are found singly, in what circumstances I have not been able to discover. Its antennæ have a large and unusually broad club. The other species, *Onthophagus egregius*, is Bornean, and the antennæ of the male are extremely complicated and remarkable. In first describing this insect I described also a form found in the same locality which I supposed to be its female. I now believe the actual female to be still undiscovered, that taken for it belonging to another species.

Another frequent difference between the sexes of the COPRINÆ is in the form of the head. This, like the front legs, is an important digging implement in the female. It is more or less spade-like, usually roughened upon the upper surface, and bearing one, two, or three strong transverse ridges. In the males the clypeus is often smoother, and the ridges may be absent, feeble, or produced into horns. Sometimes the front margin, instead of being gently turned up to form a conveniently hollowed shovel, has continued to grow upward in the middle until a process has resulted which must effectually prevent its use in that way. Such processes in some cases have acquired secondary lateral outgrowths, giving them an almost fantastic character. In *Onthophagus aviculus* (Plate XIII, fig. 12) the sides of the head have also a tendency to elongation in the male. More frequently, as in that species, *O. ephippioderus*, *Catharsius capucinus*, and many more, the posterior margin has developed a similar outgrowth.

In many cases the carina representing the line of junction between the head and clypeus, instead of disappearing, has developed in the male into a strong crest, *e. g.*, in *Heliocopris tyrannus* (Plate VI, fig. 1). Greater elongation results in a horn in this situation, sometimes of thread-like slenderness at its fullest development, as in *Onthophagus mopsus* and *O. spinifex* (text-fig. 3, *a*), or, instead of being drawn out into a simple process, the more slender the more it is extended, the ridge may be produced at its two ends, so that a pair of horns results. Such paired horns usually remain joined by a connecting ridge, but this may disappear, leaving them quite detached (*O. tragus*, etc.). Further elongation of a two-horned ridge may produce a long forked horn, as seen in *Liatongus vertagus*, of which the female (Plate XII, fig. 1) has two separate horns and the male (Plate XII, fig. 2) a long bifurcate one.

The horn, or horns, may occur upon the thorax instead of the head, or both head and thorax may display them, as in such remarkable creatures as *Heliocopris gigas* and *Onthophagus imperator*. The thoracic horns are no less

varied than those of the head. They appear generally to have arisen as extensions of the edges of a dorsal cavity, although the front angles are occasionally also produced, as in *Heliocopris gigas*. A median thoracic cavity is often found adapted to the form of a median reclined cephalic horn, the lateral margins of the cavity sometimes forming a ridge on each side. The cavity is probably a modification of a more primitive median groove, corresponding with an internal chitinous ridge related to the musculature of the fore-legs. As a single head-horn is often accompanied by a thoracic cavity, paired head-horns may be associated with a thoracic prominence interposed between them, probably derived from the hind margin of the primitive cavity. The male of *Liatongus rhadamistus* (Plate I, fig. 10) shows a deep cavity, of which the front and side margins have given rise to short processes, and in *Onthophagus amplexus, O. gladiator*, and *O. imperator*, (Plate XIII, figs. 14, 17, 19) the hind margin is produced into a most remarkable knife-like projection. Very commonly the cavity extends to the whole anterior part of the thorax, its posterior margin only being sharply defined (as in *Copris iris* and *C. hispanus* (Plate IX, figs. 9, 13))or its lateral margins may be produced into sharp processes and the posterior margin form a broad lobe so advanced in the middle as to divide the cavity into two (as in *C. sarpedon* and *C. magicus* (Plate IX, figs. 1, 11)).

Like cephalic horns, the thoracic horns may be directed forward, backward, or upward. In the genus *Drepanocerus* two little Indian species (*D. sinicus* (text-fig. 54) and *D. setosus* (text-fig. 53)) are so closely related that the females can only be distinguished with difficulty, but the males carry horns upon the thorax of remarkably different appearance. That of the former has one on each side arising anteriorly and directed backward, and that of the latter a single one arising behind, pointing forward, and forked at the end. The horns of these two little insects, although actually minute, are very long in proportion to the size of the bearers, for these measure no more than one-sixth of an inch in length.

For the consideration of the significance of sexual dimorphism the features peculiar to the female sex are not less important than those distinctive of the male. In a small group of large species of *Onthophagus* (*O. rubricollis, O. manipurensis*, and a few others) the first tarsal joint in the four posterior legs is broader in the female than in the male, perhaps forming a kind of trowel for the manipulation of the larval food-supply, or a climbing accessory to facilitate scaling the walls of the shaft. Its lower face is roughened, and it is often found caked with mud, although the rest of the body is perfectly clean. In *Copris punctulatus* the female

has a process at the back of the head and a slight projection of the front margin of the pronotum, both of which are absent in the male. In *Oniticellus pallipes* there is a small horn upon the head not found in the male, and in the African *Onitis castelnaui* the massive cephalic horn is confined to the female. The occurrence of a horn peculiar to the female is very exceptional. It is less exceptional to find the female bearing a horn of a kind different from that of the male. *Onthophagus imperator*, as shown in Plate XIII, figs. 19 to 22, has remarkably developed horns in both sexes; but, while those of the male are very slender and a little thickened or knobbed at the end, those of the female are rather stouter and strongly forked. Still more strangely, in *O. sagittarius* the female (Plate XII, fig. 4) has a short erect horn upon the head and another, directed forward, upon the thorax, while the male (Plate XII, fig. 5) has neither, but carries a pair of short lateral horns upon his head. Conversely, in *Liatongus vertagus* it is the male (Plate XII, figs. 2, 3) which has a single horn upon both head and thorax, while the female (Plate XII, fig. 1) has a pair upon the head. In *Onthophagus marginalis* (text-fig. 26) the head of the female has a pair of perpendicular horns united by a rectangular plate at the base, and that of the male is produced backwards horizontally and tapers to a sharp process, curving upward.

In a certain number of species the two sexes have an identical armature. *Onthophagus bonasus* (Plate XIII, figs. 5, 6) has a rather deceptive resemblance to the very abundant *O. catta* (text-fig. 23), and both species have a pair of long, backward-curving cephalic horns; but in the latter these are peculiar to the male, and in *O. bonasus* they are possessed by both sexes. In the same genus a small group, of which *O. tarandus* (text-fig. 17) is the Indian representative, is remarkable for the rather elaborate armature, common to both sexes alike. It consists of a pair of widely diverging sharp horns upon the head and a broadly-forked median horn and pair of lateral spikes upon the thorax.

A very important fact emerging from recent investigations into these sexual features is that their degree of development is closely correlated with the size of the individual showing them. If a series of examples of any horned beetle is arranged in the order of their size it will invariably be found that the armature increases in the same order, but in a much more marked degree. If in one part there is not a proportionate increase compensation will be found in another part, and the total result is that every increase in the size of the insect is accompanied by a still greater increase in its armature. In the smallest males of a horned species the horns are often entirely absent, so that it is not easy to distinguish them from the females. Associated with this correlation between

size and armature is the fact, to be observed in many groups of insects, that outgrowths peculiar to the male are especially liable to appear in the largest forms in those groups, and are rarely, if ever, found in the smallest forms. I have already mentioned that the extreme examples of male armature are found in the bulkiest of all insects, belonging to the DYNASTINÆ. The largest of all the COPRINÆ, those belonging to the genus *Heliocopris*, also include the most heavily armed in this subfamily. Those cases, already mentioned, in which elongation of the fore-legs has reached a fantastic extreme (*Euchirus* and *Acrocinus*) are also exceptionally large members of their respective groups.

The disappearance of the armature in small males occurs in those species in which the females are unarmed. In those in which the female also is armed the armature of the male seems never to fall below the female level. In cases in which the females have a less highly developed but distinctive type of armature small males may assume that armature, but the converse is unknown. Thus there is dimorphism in the males, as well as the more familiar dimorphism between the sexes.

The subject of dimorphism in the armature of the male has received little attention; but, as in the case of sex-dimorphism, the possibility must always be borne in mind that forms which have been regarded as belonging to different species may really be phases of one polymorphic species. Several such cases have been recently placed on record. One interesting type of male dimorphism appears to be connected with the principle which has been mentioned of the fixed relation existing between the size of the insect and its armature. When, from some unknown cause, a reduction in the size of the latter occurs, a compensating outgrowth may appear in some other situation. A simple instance is *Onthophagus tragus*, which has normally a pair of separate horns upon the head. Occasionally a minute tooth is visible between the two, but increase in the size of this is always accompanied by a corresponding reduction of the lateral horns. In certain specimens these are very short, and the median process exceeds them in length. More conspicuous examples of the same phenomenon are the great *Heliocopris dominus* and *gigas*, in which the diminution of the normal horns is accompanied by the appearance of another pair, or of a carina elsewhere. In large specimens of these two Indian species the head bears a pair of horns at its outer margins (Plate IV, fig. 3), but in small specimens these are sometimes absent and replaced by a transverse carina (Plate IV, fig. 2). In an intermediate stage four small horns are present, two diminished marginal ones and two inner ones representing the angles of the carina (Plate IV, fig. 1). The best example of this compensatory principle is found in a South American Dynastid, *Enema pan*,

which has two male forms, in one of which there is a long simple horn on the head and a forked horn on the thorax; while in the other the head horn is forked and the thoracic horn simple†.

The three phases of another polymorphic Indian species are represented here. The two sexes of *Onthophagus spinifex* are curiously different. The female (text-fig. 3, *c*) is not only destitute of the very long and slender horn normally found on the head of the male (text-fig. 3, *a*), but her thorax is closely packed with granules, whereas that of the male is smooth and shining except at the sides, where it is finely punctured. The female thorax also has two cavities in front, with a strong prominence between them. The length of the horn of the male is very variable, and the puncturation of the thorax is correlated with it, being more extensive in proportion as the horn is shorter. But there is a second male phase (text-fig. 3, *b*) which is completely hornless, having a carina in place of the horn, like

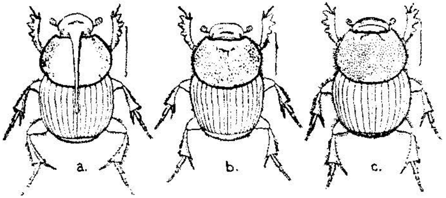

Fig. 3.—*Onthophagus spinifex*:
a, horned male; *b*, hornless male; *c*, female.

the female. In this phase two separate tubercles appear near the front of the pronotum, so that it is quite distinct from both the ordinary phases of the species.

How are all these peculiar structures to be interpreted? From the fact that they are generally distinctive of the male, and the obviously close analogy with the similar appendages of many higher animals, it is natural that they should be looked upon at first as weapons; but a very cursory survey of the various forms of armature represented in this volume will probably suffice to show that the majority are peculiarly unsuited for combative purposes. The horns borne upon the head are often extremely delicate and brittle, sometimes almost thread-like, and more often directed backward than forward, while thoracic processes are generally so placed that it would be almost impossible to bring them into contact

† Arrow, "Polymorphism in Horned Beetles," Trans. Ent. Soc. Lond. lxxvi, 1928, p. 73.

with any part of the body of a rival. In spite of their frequent fragility, it is unusual to find the horns broken or in any way damaged, and, on the other hand, these well protected insects have no cause to fear any injury which could conceivably be inflicted even by the most practicable of such weapons. Superficial scratches of no real consequence may sometimes be seen upon male Stag-beetles, probably caused by the jaws of other males, but no marks attributable to the horns of another male have ever been noticed upon a horned Lamellicorn. The males of many beetles will, of course, fight together, and even devour one another, but there is reason to believe that the members of those Lamellicorn groups especially remarkable for their armature are among the most pacific of their tribe.

As already related in another part of this Introduction, where the two sexes collaborate in the labour of nidification it appears to be the usual function of the female to dig and of the male to transport the materials. In such cases there seems to be some adaptation of each sex for its respective functions, and the distinctive form of the male thorax in certain forms, such as *Catharsius molossus* (Plate VIII, fig. 6) and various species of *Copris* (*C. iris*, *C. magicus*, etc.) may almost certainly be explained in this way. Most burrowing insects in the process of tunnelling push the excavated material behind them. For this purpose it is evident that the usual rounded form of the hinder end of the body in beetles would be very inconvenient, and we therefore find in many burrowing Coleoptera (SCOLYTIDÆ, BOSTRICHIDÆ, CUCUJIDÆ, etc.) that the posterior part is squared or truncate, usually with more or less sharp projections at the edges of the truncature, and often with the tips of the elytra drawn out to form a kind of hollow scoop. All these are elongate insects which, being unable to turn round in their burrows, can only expel the excavated material by pushing it backward. The male *Copris*, however, appears to remove the material dug out by the female by pushing it in front of him, and the horns of the thorax in many species are so shaped as to produce a form very similar to that of the end of the body in the insects just referred to, the shovel-like head forming the lip of the scoop. Sometimes, as in *Copris hispanus* (Plate IX, figs. 13, 14), both sexes have the thorax of this form, perhaps because the division of labour is incomplete, but usually it is confined to the male.

A peculiar form of horn which occurs again and again in males of certain species of several different genera appears also to have some relation to the insects' occupations. The use of the head as a shovel necessitates in all COPRINÆ a close co-adaptation between its hinder part and the front margin of the thorax, and there is always a ridge at the back of the

head fitting against this margin, so that rigidity of the whole front of the body is secured when force has to be applied. A remarkable accessory device for securing this rigidity is seen in *Synapsis brahminus* (Plate VII, fig. 9) and *S. tridens* (Plate VII, fig. 8), where the front angles of the thorax are hollowed out and the head has a hooked process on each side, fitting into the corresponding hollow. The anterior ridge of the head just mentioned is often produced in the middle, and the resulting processes generally differ in the two sexes. In many males, such as those of *Phalops divisus* (Plate I, fig. 2), *Caccobius himalayanus*, *Onthophagus marginalis* and *O. rubricollis*, and various species of *Catharsius* and other genera, the process, instead of standing erect, as usual in the female, is drawn backward as a flat and often triangular plate lying upon the thorax, which is hollowed to receive it. In *Phalops* the apex of the triangle is split, like the nib of a pen, showing that the plate has been derived from a pair of horns brought close together. The independent occurrence of an identical arrangement in so many different cases suggests a common object, which may be only to increase the rigidity between head and thorax. If we regard the head of the male as designed to carry loads, this seems the most convenient form that a horn upon it could assume.

These, however, are secondary adaptations of the horns, and, although other adaptations may perhaps fit them for other uses, such adaptations throw no light upon their primary significance.

In 'The Descent of Man,' Darwin says of horned beetles: "The conclusion that the horns have been acquired as ornaments is that which best agrees with the fact of their having been so immensely, yet not fixedly, developed, as shown by their extreme variability in the same species, and by their extreme diversity in closely allied species" (referring to his view that such structures owe their development to the selection by the females of those males possessing them in the most striking degree). Knowledge which has accrued during the last half-century has tended to prove that this is not an adequate explanation of the facts, and that other causes must be looked for, in insects at least, if not in higher animals. The females of various dimorphic insects are often seen to be mobbed by crowds of males, but I believe there is no satisfactory evidence of any observed exercise of preference by a female insect such as Darwin supposed to exist. In 'A Naturalist in Hindustan,' Major Hingston has related how he tried the experiment of removing one or other of a pair of *Gymnopleurus*, while co-operating in their task of ball-rolling, replacing him or her by another of the same sex. The beetles showed no consciousness of the change, but

proceeded with their task as though nothing had happened. Although highly sensitive to light changes, the eyes of insects have probably little sharpness of vision; some are able to distinguish colours, but it is very doubtful whether any can appreciate niceties of form sufficiently for the detection of the physical superiority of one suitor over another. In this respect a more important sense is that of smell, and it is almost certainly by this sense that insects are usually attracted to one another. It has recently been noticed that, misled by scent, the males of a Hymenopterous insect in Australia habitually mistake for females of their species certain flowers which have only a very vague similarity to them in appearance. I have related in the Introduction to the Lamellicornia in this Series how males of *Pachypus cornutus* are attracted in swarms, by scent, to the female, who remains deep below the surface of the ground. Although the males are possessed of a horn, this cannot serve as a means of fascination, since the meeting takes place in total darkness.

But the most important fact concerning insect armatures is the exact correlation between their degree of development and the size of the individual insect (see p. 24). These features do not vary independently, as supposed by Darwin, but only in correspondence with variations in the size of the insects. If for any reason, therefore, large individuals have an advantage over small ones, increased development of the armature will result.

The remarkable cases which have been described here of armatures distinctive of each sex remain unexplained by any hypothesis yet put forward.

While it is probable, as already mentioned, that in some cases these structures serve a practical purpose, there is reason to believe that, at least where they are most highly developed, their presence is an indication of inability to perform the tasks undertaken by others not so handicapped. These arduous tasks are not achieved without leaving their marks upon the insects which perform them. If a collection of COPRINÆ taken at various times and places is examined, it will be found that a certain proportion of them have the teeth upon the front tibiæ more or less worn down. Young individuals will, of course, have them in perfectly fresh and sharp condition, but old specimens may have these teeth almost worn away. The front edge of the clypeus is also liable to similar wear. By a careful examination of considerable numbers of each sex separately of certain abundant species, I have found that in some the wearing-down process is common to male and female alike, and in others to the female alone. It may therefore be regarded as an indication whether or not the two sexes of a species co-operate in the labour of nidification

as described in certain instances. If only a few examples of a species are available, no conclusions can of course be drawn; but of some species large numbers have passed through my hands, and an examination of these has produced results which seem to be of some significance.

Thus a scrutiny of 60 specimens of *Copris hispanus*, in which Fabre has described the collaboration of the two sexes, both of which are horned, has shown wear in an exactly similar proportion of each sex, 17 out of 24 males and 27 out of 37 females. Of 49 males and 52 females of the common *Onthophagus catta*, of which the male has short horns while the female is unarmed, 30 males and 33 females were decidedly worn, *i. e.*, practically the same proportion of each; and of *O. ephippioderus*, of which, also, the male has a slight armature and the female none, 19 out of 27 of each sex showed wear. On the other hand, 43 specimens of *O. rangifer*, an African species with fantastically long horns in the male only, showed a very different result: half the females were worn but not a single male. Another *Onthophagus* of which the male has an extremely long horn, *O. blanchardi*, showed the same: most of the females (23 out of 38) were worn, but all the males (31) were in perfect condition. The general conclusion resulting from an examination of over a thousand specimens belonging to 25 species of horned Lamellicorns is that where the two sexes have similarly developed armatures, or where that of the male is of moderate development only, both sexes are likely to show the effects of use in the fore-legs in a similar degree; but where they are very dissimilar, and the male has an exaggerated armature, the evidences of labour are found in the females alone. In the latter category either the acquisition of such excessively developed structures has rendered any labour impossible, or the fact that no labour is performed has made it possible for the development of the armature to continue to a point which could not otherwise have been reached, owing either to the restraining effect of natural selection or the previous extinction of the species.

If this interpretation is correct, and the functions of these insects are performed not by the help of these appendages, except in certain cases where they have become specially modified for the purpose, but in spite of them, it is probably also correct to suppose that the usual absence of the features in the female, or the occurrence of vestiges only, is due to their repression as obstacles to the efficient performance of her functions. A. R. Wallace has contended in his 'Tropical Nature' (chap. v.) that the common occurrence of more vivid colours in male birds, insects, etc., is explainable by an inherent tendency, due to greater vigour in that sex, and the suppression, by the operation of natural selection,

of any similar manifestation in the females, in many cases resulting in a protective coloration for the better preservation of their progeny. A brighter coloration is often found in association with horns or other forms of armature in male Lamellicorn beetles, as in the large Indian DYNASTINÆ *Xylotrupes gideon* and *Chalcosoma atlas*, the well known Hercules-beetle (*Dynastes hercules*) of South America, and many others, and colour dimorphism is only another phase of the phenomenon under consideration. The recently discovered correlation between the degree of development of the sexual outgrowths and the size of the individual exhibiting them, and the common tendency for these features to appear in the largest members of any group, give strong support to Wallace's interpretation as the right one, not only in regard to the brighter colouring of the male, to which he applied it, but also to the whole range of structures here described and the greater range met with in other animal tribes, namely, that they are manifestations of a special degree of vigour, and primarily without any particular utility. Champy and other recent investigators have elaborated Wallace's view, and explain all the forms of sexual dimorphism as due to the production by the sexual glands of hypothetical bodies called hormones.

Why these structures sometimes assume one form and sometimes another is a problem upon which little light can be thrown. I have already mentioned that outgrowths distinctive of the male are found on many parts of the body—indeed, there is practically no part upon which they do not occur in beetles of one kind or another. Upon most parts, however, the lower surface, the legs, elytra, antennæ, etc., there are strict limits of growth beyond which they would seriously impede movement and ultimately render existence impossible. The only regions in which outgrowths of the kind can be developed to a very considerable extent and still be carried without serious inconvenience are the upper surfaces of the head and prothorax, and it is there alone that huge and fantastic armatures occur.

It is evident from those instances I have given in which the armature is identical in both sexes, and from its frequent occurrence in a rudimentary form in the female, that, although primarily masculine, it is capable of being transmitted to the other sex, except so far as it is restrained by a stronger force. I believe the restraining influence to be that pointed out by Wallace as explaining the less conspicuous plumage of female birds, viz., the injurious effect upon the progeny of any handicap to the efficient performance of the maternal functions. The life of male insects is generally shorter than that of the females, or at

least the period during which exposure to risk involves the failure of the following generation is so, and as a consequence natural selection operates more effectively upon the females than upon the males. This seems to be confirmed by the evidence I have quoted that those males with the most highly developed armature take no part in the labour of nidification. Where both sexes have a similar armature there is reason to believe that it is either of a useful character or of no significance at all in the economy of the species.

When each sex has a distinctive armature of its own, as in *Onthophagus sagittarius* and *O. marginalis*, we must suppose that the male has first acquired an armature, which has been transmitted to the female, and subsequently, for some unknown reason, lost it, probably by the operation of the principle of compensation of which I have given examples, developing another form of armature simultaneously with its disappearance. We can only account in this way for the remarkable *Onitis castelnaui*, of which the female alone carries a massive horn, while the male has a great sternal prong. No male in the large genus *Onitis* is horned, but the occurrence of a small prominence in the middle of the head, not infrequently more pronounced in females than in males, suggests that some or all formerly bore horns, as do the males of the genera related to them. The processes upon the legs in many of the species perhaps replace these lost horns.

In a remarkable Mexican species of *Liatongus* (*L. monstrosus*) the female bears two short horns upon the head and three upon the prothorax, while the male has lost all but one tiny horn, but has instead large wing-like expansions of the thorax which give it the form of a broad hollow receptacle. It seems a reasonable supposition that the male had formerly an armature similar to that still possessed by the female; but that, as an adaptation to his special function as a carrier in the operations of nidification, he has lost this and acquired instead outgrowths of a useful character. A similarly dilated and hollowed thorax is found in males of various other species.

I have mentioned that horns appear to have generally arisen as extensions of a previously existing ridge or edge. We may think of them, therefore, as continued deposits of chitinous material correlated with a progressive increase of size in the beetle and originally confined to the male, but capable of being transmitted to the other sex. The outgrowths are in most cases checked in the female, although sometimes developed to an equally great extent in both sexes, and they may be adapted to utilitarian purposes in the male. When not so controlled by natural selection they may continue to develop to a fantastic and excessive degree, perhaps ultimately bringing about the extinction of the species.

Colour and Pattern.

Although they include many species of very vivid and beautiful colouring, reaching a climax in the Tropical American genus *Phanæus*, the Coprinæ are not as a whole a brightly coloured group. Many of the genera, including some of the most important, such as *Copris*, *Catharsius*, and *Heliocopris*, consist almost entirely of black insects, and black is the predominant hue. It should be remembered, however, that both black and vivid colours are conspicuous in an ordinary environment and experiments which have been made, particularly by Sir G. A. K. Marshall in Rhodesia, recorded in Trans. Ent. Soc. Lond. 1902, tend to show that the group may be regarded as protected by a marked degree of unpalatability.

Numerous ball-rolling species in different parts of the world pursue their curious occupation in full daylight, and without any attempt at concealment, so rendering themselves exceedingly conspicuous, and it seems improbable that such a habit could ever have been developed had they not possessed a high degree of immunity from the attacks of insectivorous creatures, as otherwise they must almost inevitably have been exterminated. Many of these insects are entirely black, and others exhibit brilliant metallic colours or conspicuous patterns, and it can scarcely be doubted that these serve to render them more easily recognizable, and so to diminish the risk of their being seized by inadvertence. It is interesting to find in Africa a series of species of other Coprinæ belonging to the genera *Onthophagus* and *Phalops* associating with different species of ball-rollers of the genus *Gymnopleurus* found in different parts of the continent, and in each region mimicking, in extraordinary detail, the appearance of the particular *Gymnopleurus* occurring there: a small black and white species in West Africa, a large blue one in Rhodesia, a parti-coloured one in Abyssinia, vivid crimson upon the anterior half and blue upon the posterior half, etc.—each is accompanied by a mimicking *Onthophagus* or *Phalops*. That the species of *Gymnopleurus* are the models and the others the mimics is indicated by the fact that in several of the former a patch of white hairs at the side of the body, which is exposed owing to the cutting away of the elytra behind the shoulders characteristic of this genus, is simulated in the other by a patch of hairs situated, not upon the abdomen, which is not exposed, but upon the elytra at the corresponding point, and found in these mimics alone. We may, therefore, conclude that the ball-rolling *Gymnopleuri* have better natural protection than their mimics, which, of course, are found closely associated with them* when all are engaged in collecting their food-material. I have given fuller particulars of these

mimetic associations in Proc. Ent. Soc. Lond. i. 1926, p. 19. The three genera concerned are all represented in India, but no mimetic associations have been noted, up to the present, except in Africa.

Further acquaintance with the genera *Onthophagus* and *Phalops* shows that they include both brilliant forms suggesting warning coloration, and others of dirty-brown tints evidently serving for concealment. One of the latter type, *Onthophagus catta*, very abundant both in India and Africa, was found by Marshall in large numbers in the stomachs of a hawk and a goatsucker, and it is in this genus, and those nearly related to it (*Phalops*, *Liatongus*, etc.) that we find every type of coloration, ranging from extremely bright to very dull and inconspicuous forms. The violently contrasted orange and blue-black *Liatongus rhadamistus*, shown on Plate I, fig. 10, exhibits a typical warning coloration, and may, without fear of disproof, be pronounced a highly unpalatable insect. The same may, no doubt, be said of very conspicuously coloured species such as *Onthophagus pactolus* (fig. 11), *O. igneus* (fig. 4), and others represented on the same Plate. On the other hand, dull sombrely coloured forms like *Onthophagus tibetanus* and *cupreiceps*, or *Oniticellus spinipes*, and those with indefinite patterns in neutral shades like *Oniticellus pallens* and *pallipes*, seem designed to harmonize closely with their environment, and we may conclude that they have need of such protection from the sharp eyes of foraging birds or other enemies.

In the almost endless diversity of the multitudinous forms of the genus *Onthophagus* there is probably every degree of palatability, and this great mass of varied but closely related species affords excellent material for studying the evolution of pigmentation and pattern. As was pointed out in my volume in this Series upon the ENDOMYCHIDÆ and related families, a uniformly black coloration, such as the majority of COPRINÆ exhibit, appears to result from a gradually increasing pigmentation, during which a series of pattern-stages is passed through. Beginning with a uniformly pale coloration, such as is found in some primitive forms like *O. ochreatus*, an almost invariable tendency manifests itself to a darker coloration upon the head and thorax than upon the elytra. Occasionally the sides of the thorax remain pale to a greater or less extent when the middle is dark; but the pigmentation of the elytra is a much more complicated and gradual process, and colour-pattern is almost confined to them. The pigmentation begins by the appearance of an inconstant mottling, either confined to the punctures, as in *O. rectecornutus*, or consisting of irregular and unsymmetrical specks and patches, as in *O. marginalis*. The next stage seems to be the

concentration of the dark pigment at the inner and outer margins and in the alternate intervals of the elytra, not at first reaching the front and hind margins (*O. zebra, cervus, difficilis*), but extending later throughout these intervals and across the intervening spaces, the extremities of which remain as pale marginal spots when the rest of the surface has become wholly dark, and disappearing last of all. Different stages of this progression are characteristic of different species, but the patterns are often more or less inconstant, and a deficiency or excess of pigment results in the appearance of an earlier or later stage in the progression. The occurrence of a practically identical pattern does not necessarily indicate close relationship, for similar colour-phases are found not only in different groups of *Onthophagus*, but also in the neighbouring genus *Caccobius*. The longitudinally striped phase, for instance, occurs in *Onthophagus taurinus* and *Caccobius gonoderus*, and species with pale front and hind marginal spots in *Onthophagus falsus* and *Caccobius denticollis* amongst others. In all these the pattern is more or less inconstant.

Slight modifications of the phase with transversely uniting dark patches and pale front and hind margins give rise to the pattern which in some form is that of nearly all those species of *Onthophagus* with a well developed colour-scheme. This consists in the transverse division of the conjoined elytra into three areas by a black band of irregular outline, and is represented by *O. fasciatus, unifasciatus, bifasciatus, favrei*, and various other Indian species. A further development occurs in which encroachment of black pigment upon the pale areas results in these becoming broken into four (*O. kchatriya*) or five (*O. felix*) irregular pale patches upon each elytron, and these in *O. militaris* and *O. martialis* have still further shrunk into small spots, and in *O. coorgensis* have become again disrupted. Further advance in the same direction can only result in uniformly dark coloration.

In many of the black forms, of which the genus *Onthophagus* contains so many, a slight metallic lustre, sometimes very faint indeed, may appear in certain parts, and especially upon the head. This is due to refraction of light, and no doubt the microscopic sculpture of the chitinous surface is the cause.

Classification.

The group of beetles now recognized as the subfamily COPRINÆ were brought together by Linnæus into his genus *Scarabæus*, together with all the other representatives known to him of what is to-day regarded as the suborder LAMELLICORNIA. Those followers of Linnæus who made a special

study of insects speedily found the necessity of subdividing this immense and diverse assemblage. The first of these was Fabricius, who, in his 'Systema Entomologiæ,' published in 1775, began the process of dismemberment by removing the Stag-beetles (now constituting the family LUCANIDÆ) from *Scarabæus* under the name of *Lucanus*; and, in his 'Species Insectorum,' published in 1781, he removed other groups of species under the names *Trox*, *Melolontha*, *Trichius*, and *Cetonia*, all the remainder being left in the genus *Scarabæus*.

The next step was taken by Fourcroy, who in 'Entomologia Parisiensis,' 1785 (adopting names introduced in 1762 by Geoffroy, whose work, 'Histoire des Insectes des Environs de Paris,' not being in accordance with the binomial system, can be disregarded), formed the genus *Copris* for the part of the Linnean *Scarabæus* now constituting the subfamily COPRINÆ.

In 1796 Latreille's 'Précis des Caractères' introduced the name *Geotrupes* for the species with 11-jointed antennæ. Two years later Illiger, in his 'Käfer Preussens,' devised the genera *Oryctes* and *Aphodius*, restricted the genus *Scarabæus* to the group of species to which Latreille had already given the name *Geotrupes*, and transferred that name to the insects remaining in *Scarabæus*. This exchange of names is obviously inadmissible, the intention of the previous revisers being to limit the name *Scarabæus* to the group of species placed first in order by Linnæus, that is, the giant forms now representing the subfamily DYNASTINÆ.

In 1798 Fabricius published a Supplement to his 'Species Insectorum,' in which, while adopting the genus *Copris*, he separated for the first time the now familiar and easily recognised genus *Onitis*, accepted Illiger's error in applying Latreille's name *Geotrupes* to the bulk of the species left in the old genus *Scarabæus*, and applied the last name in yet another sense, viz., to a small group of insects corresponding roughly with *Aphodius* of Illiger.

In Creutzer's 'Entomologische Versuche,' 1799, the most important morphological feature of the ball-rolling species now included in the genera *Scarabæus* and *Gymnopleurus* was for the first time pointed out and the name *Actinophorus* proposed for them, *Scarabæus sacer* and other related forms being enumerated. In 1801 appeared Weber's 'Observationes Entomologicæ,' in which the name *Ateuchus* was introduced for *Scarabæus sacer* and its congeners, although without naming them. Fabricius, in his 'Systema Eleutheratorum,' published later in the same year, adopted this name (the earlier *Actinophorus* being, perhaps, unknown to him), used *Scarabæus* in the inadmissible sense of Illiger, and again misapplied Latreille's name *Geotrupes* to the residuum (the

DYNASTINÆ of the present day), to which *Scarabæus* had been reduced.

Latreille's 'Histoire Naturelle des Crustacés et Insectes,' vol. iii (1802), besides introducing for the first time the largest by far of all the Coprine genera, *Onthophagus*, cited what he regarded as the typical species of all the genera formed to that date from the disruption of the genus *Scarabæus*, including *S. sacer*, representing the genus *Ateuchus*, and *S. hercules*, representing the genus *Scarabæus*, sensu stricto. The name *Dynastes*, now in general use for *S. hercules*, was introduced in 1825 by Kirby.

Lacordaire, in his 'Genera des Coléoptères,' 1856, adopted *Ateuchus* and *Dynastes*, and the name *Scarabæus* was allowed to disappear altogether, but Gemminger and Harold's 'Catalogue' of 1869 restored it and deposed *Ateuchus*, which appeared as a synonym of it.

It is evident from this survey that it is *Dynastes* which should, on the ground of absolute priority, have been made a synonym of *Scarabæus*, while *Actinophorus* antedates *Ateuchus*. This transfer would now cause such undesirable and unnecessary confusion in two particularly well known and important genera that I propose to treat the names in use as *nomina conservanda*. There can, I think, be no doubt that any list of names eventually agreed upon as entitled to special treatment of this kind must include *Scarabæus* and *Dynastes*. The systematic part of this volume therefore begins, not with the unknown name *Actinophorus*, but with one of the most ancient and familiar of zoological names, *Scarabæus*.

This group of insects was divided by Lacordaire into two main groups, which he called Ateuchides and Coprides, differing principally in the shape of the middle and hind tibiæ, the first group having these very slender and not dilated at the end, while the second has them shorter and stouter and broadening towards the end. The discovery of forms unknown to Lacordaire has shown that the two divisions are not as sharply divided as they appeared to him to be. The shape of the tibia changes by very slight degrees from one type to the other, and to find a natural line of division is not easy. I have found that the tarsi provide, for the Old World genera at least, a more satisfactory means of division. The proportions of the joints of the four posterior tarsi are very constant throughout large sections of the subfamily, but quite different in different groups. In the largest group the joints are flattened and successively diminish in size from the base, the first being relatively very long. Three smaller groups can be recognized in which the proportions, different in each case, are entirely unlike those of the main group. One of these, the SCARABÆINI, is distinguished from all the rest by more important characters, and is placed first in order.

Key to the Divisions of Coprinæ.

1 (2) Middle coxæ not widely separated; middle tibia with one terminal spur ..	[p. 38. I. **Scarabæini**.
2 (1) Middle coxæ widely separated; middle tibia with two terminal spurs.	
3 (6) Basal joint of the hind tarsus much longer than the second.	
4 (5) Posterior legs extremely long, the tarsi filiform	II. **Sisyphini**, p. 66.
5 (4) Posterior legs not extremely long, the tarsi more or less flat and tapering...	III. **Coprini**, p. 78.
6 (3) Basal joint of the hind tarsus not much longer than the second	IV. **Panelini**, p. 404.

Division I. SCARABÆINI.

The body is rather depressed in form and the legs are very slender, the middle and hind tibiæ narrow and not dilated at the end, each bearing a single terminal spur only; the tarsi filiform, not flattened nor broader at the base than at the end, the first four joints differing little in length. The middle coxæ converge strongly behind. The clypeus is produced into two or more lobes in front, and the ocular lobes are usually more or less prominent in front.

The sexes do not conspicuously differ, and the males are not horned.

The insects forming this group are the well known ball-rollers.

Key to the Genera of Scarabæini.

Front tarsi absent; elytra not excised behind the shoulders	SCARABÆUS L., p. 38.
Front tarsi present; elytra excised behind the shoulders	[p. 46. GYMNOPLEURUS Ill.,

Genus SCARABÆUS.

Scarabæus L., Syst. Nat. ed. x, 1758, p. 345; F., Syst. Ent. 1775, p. 3.
Actinophorus Creutz., Ent. Ver. 1799, p. 79.
Ateuchus Weber, Obs. Ent. 1801, p. 10; F., Syst. Eleuth. i, 1801, p. 54; Latr., Gen. Crust. et Ins. ii, 1807, p. 76; Hist. Crust. et Ins. iii, 1802, p. 140; Lacord., Gen. Col. iii, 1856, p. 66.

TYPE, *Scarabæus sacer* L.

Range. S. Europe, Asia, Africa.

Body flat, with slender legs, the front pair destitute of tarsi, the tarsi of the middle and hind legs slender, the joints nearly equal in length and breadth, the tibiæ bearing fringes of long hairs. Front femur long, the tibia armed externally with four

long teeth, or three long teeth and one short one, occupying almost the whole length of the outer edge and fringed at the inner and outer margins, the extremity bearing a strong spur. Middle coxæ strongly oblique, their posterior extremities only narrowly separated: femur long and narrow; tibia slender, of nearly uniform width, or a little tapered at the extremity, fringed at the inner and outer edges and armed at the extremity with a single strong immovable spur. Hind coxæ oblique, meeting at their inner extremities, the femora and tibiæ long and slender, the latter curved, of uniform width, bearing four fringes, inner, outer, upper, and lower, the extremity bearing a single strong immovable spur. Head flat, the ocular lobes sharply produced in front and not completely fused with the clypeus, which is produced into four strong teeth at the front margin. Pronotum slightly convex, deeply excised in front, with the front angles not produced but generally sharply toothed, the sides dilated, and the hind angles more or less rounded. Scutellum sometimes visible, sometimes absent. Elytra flat, with very narrow epipleuræ, not sinuate at the sides. Mesosternum very short. Metasternum moderately long. Labrum straight at the front margin, with a median tongue or tuft at right angles to the edge. Mandible narrow, with a short internal, and long apical, fringe. Maxilla with a sharp terminal angle to the chitinous outer edge, the inner and outer lobes rather small, the palpus slender, with a long terminal joint. Mentum elongate, with the anterior edge rounded, the ligula strongly bilobed, the palpi slender, far apart, loosely 3-jointed, the basal joint slender, the 2nd about as wide as it is long, the 3rd about as long as the 2nd, but much more slender.

Antennæ 9-jointed, the basal joint long and slender, the 2nd small and bead-like, the 3rd about as long as the 4th and 5th together, the 5th extremely short, the 8th and 9th partly enclosed by the 7th.

Key to the Species of Scarabæus.

1 (10) No scutellum; front tibia armed externally with four strong teeth.
2 (7) Forehead without a sharp median tooth.
3 (6) Upper surface opaque.
4 (5) Pronotum unevenly punctured; head bearing two tubercles .... *sacer* L., p. 40.
5 (4) Pronotum irregularly granular; head without tubercles .... *gangeticus* Cast., p. 41.
6 (3) Upper surface shining .... *brahminus* Cast., p. 42.
7 (2) Forehead with a sharp median tooth.
8 (9) Front tibia without teeth at inner edge *cristatus* F., p. 42.
9 (8) Front tibia toothed along its inner edge .... *andrewesi* Felsche, [p. 43.

10 (1)	Scutellum visible; front tibia with the uppermost external tooth very small.	
11 (12)	Upper surface entirely dull	*devotus* Redt., p. 44.
12 (11)	Upper surface moderately shining.	
13 (14)	Pronotum convex, less broad, with smooth basal area	*sanctus* F., p. 45.
14 (13)	Pronotum flatter, broader, without smooth basal area	*erichsoni* Har., p. 45.

1. **Scarabæus sacer.** (Plate II, fig. 7.)

Scarabæus sacer L., Syst. Nat. ed. x, 1758, p. 347; Reitt., Verh. Ver. Brünn, xxxi, 1893, p. 41.
Ateuchus sacer F., Syst. Eleuth. i, 1801, p. 54.

Black and subopaque, with the legs and lower surface shining, the lateral margins of the prothorax, the legs, and lower surface clothed with reddish hair.

Broadly oval and slightly convex in shape. The *head* is densely and rugosely punctured in front and tuberculate behind, the forehead bearing a pair of tubercles placed transversely between the eyes and not far apart. The anterior edge of the *clypeus* is armed with four strong teeth separated by rounded notches. The *pronotum* is unevenly punctured, the punctures being absent along the middle line and near the base, and changing gradually into granules at the sides. The lateral margins are strongly rounded and finely and closely denticulate, the front angles are sharply toothed, the hind angles entirely rounded, and the basal margin closely and finely tuberculate and obtusely angulate in the middle. There is no visible scutellum. The *elytra* are very finely striate and extremely finely and sparsely punctured. The *pygidium* is opaque at the base, slightly shining at the apex, and very minutely and sparsely punctured. The *pro-* and *meta-sternum* are clothed with hair, and the *abdomen* is very smooth except at the sides. The front tibia bears four strong external teeth and two slight teeth, separated by a rounded excision near the middle of the inner edge. The outer edge is denticulate between and above the external teeth. The tarsi are inserted at a distance from the extremities of the middle and hind tibiæ.

♂. The front tibia is more closely fringed at its inner and outer edges, especially at the basal part of the outer edge, the middle tibia is more dilated in the basal part than that of the female, and tapers a little to the extremity, and the hind tibia has a short but very close internal fringe.

Length, 23–37 mm.; breadth, 14–22 mm.

N.W. Frontier Prov.: Nowshera (*T. H. L. Grosvenor*, July). N. Kashmir: Hunza, 8000 ft. (*R. W. G. Hingston*, May). Punjab: Thobba, Murree Hills (*Major Howland Roberts*). Waziristan (*Rev. G. Palacios*, March, April).

PERSIA. ARABIA. TURKESTAN. EGYPT. PALESTINE. CYPRUS. TUNIS. S. RUSSIA. ROUMANIA. HUNGARY. SPAIN. S. FRANCE.

As is implied by the name given it by Linnæus, this is the beetle generally represented in ancient Egyptian sculpture.

2. **Scarabæus gangeticus.** (Plate II, fig. 4.)

Ateuchus gangeticus Cast., Hist. Nat. Ins., Col. ii. 1840, p. 64.
Scarabæus indicus Mots., Bull. Soc. Ent. Mosc. xxxvi, 1863, 1, p. 457.

Black and subopaque, with the legs and lower surface shining, the lateral margins of the prothorax, the legs, and lower surface clothed with reddish hair.

Broadly oval and slightly convex in shape. The *head* is densely and rugosely punctured in front, closely tuberculate behind, the forehead with a slight transverse carina on each side adjoining the inner edge of the eye. The *clypeus* is armed with four strong teeth separated by rounded notches. The *pronotum* is finely and closely tuberculate, with a smooth median line. The lateral margins are strongly and evenly rounded and finely and closely denticulate, the front angles are sharply toothed, the hind angles completely rounded off, and the basal margin closely and finely tuberculate and obtusely angulate in the middle. There is no visible scutellum. The *elytra* are very finely striate and extremely minutely and sparsely punctured. The *pygidium* is opaque at the base, shining at the apex, and very sparsely and finely tuberculate. The *pro-* and *metasternum* are clothed with hair and the *abdomen* is very smooth, except at the sides. The front tibia bears four strong external teeth and two slight teeth, separated by a rounded excision, near the middle of the inner edge, and the outer edge is denticulate between and above the external teeth. The tarsi are inserted at a distance from the extremities of the middle and hind tibiæ.

♂. The middle tibia has a rather short internal fringe and the hind tibia a very short but close fringe near the middle of its inner edge.

♀. The middle tibia has a long internal fringe and the hind tibia a rather long and loose internal fringe.

Length, 23–35 mm.; breadth, 14–22 mm.

BENGAL: Sarda (*F. W. Champion*). PUNJAB: Thobba, Murree Hills (*Major Howland Roberts*). S. INDIA: Bangalore. CEYLON. PERSIA. ARABIA. NUBIA. ABYSSINIA. SOMALILAND. WEST AFRICA. UGANDA. EAST AFRICA. TRANSVAAL. RHODESIA.

Type ? in the Hope Dept., Oxford Museum.

Scarabæus gangeticus is related very closely indeed to *S. sacer*, which through a large part of its range it replaces. It is without the pair of small but well defined tubercles between the eyes which always distinguish *S. sacer*, and the

sculpture of the pronotum is a little different, consisting of rather closely set fine granules. In addition, the male has the middle tibia of more uniform width and not tapered at the end, and the short dense fringe at the inner edge of the hind tibia does not extend so far as in *S. sacer*.

The Oxford Museum contains specimens of this from the Gory Collection, in which Castelnau found it, but there is no means of identifying the type with certainty.

3. **Scarabæus brahminus.** (Plate II, fig. 3.)

Ateuchus brahminus Cast., Hist. Nat. Ins., Col. ii, 1840, p. 64.

Black and shining, with long reddish hair clothing the lateral margins of the thorax, legs, and body beneath.

Broadly oval and scarcely convex. The *head* is coarsely rugose in front and granulate behind, with a very feeble median tubercle. The four clypeal processes are separated by rounded notches. The *pronotum* is sparingly punctured, more closely in front, with the sides slightly opaque. The lateral margins are evenly rounded and finely serrate, the front angles are rather sharp, the hind angles entirely rounded, and the base is margined with a close series of setigerous pits. There is no visible scutellum. The *elytra* are finely but distinctly serrate, with the intervals finely, sparsely, and irregularly punctured. The *pygidium* is semiopaque and finely and sparsely punctured. The lower surface is smooth and shining, but the front and sides of the *metasternum* are clothed with long hairs. The front tibia bears four long external teeth and is minutely serrate between and above them, the four posterior legs are very slender, the middle tibiæ rather short, and the hind ones long and bisinuate.

The sexes are scarcely distinguishable externally.

Length, 19–23 mm.; breadth, 11–14 mm.

SIND: Karachi. BHUTAN. UNITED PROV.: Moghal Sarai (*C. S. Betton*, July). BIHAR: Chapra (*Mackenzie*). S. INDIA: Perundurai, Coimbatore Dist. (*H. L. Andrewes*, April); Trichinopoly (*C. Leigh*, Oct.); Palur Farim, S. Arcot (June); Coimbatore (*T. Bainbrigge Fletcher*, Oct.); Guvvalacheruvu, base of Palkonda Hills, 500 ft. (*H. S. Pruthi*, Aug.); E. foot of Nallamalai Hills, 1000–1500 ft. (*H. S. Pruthi*, Aug.).

4. **Scarabæus cristatus.** (Plate II, fig. 5.)

Scarabæus cristatus F., Syst. Ent. 1775, p. 27; Gill., Ann. Soc. Ent. Belg. lv, 1911, p. 308.

Scarabæus compressicornis Klug, Symb. Phys. v, 1845, pl. 41, fig. 1.

Ateuchus cornifrons Cast., Hist. Nat. Ins., Col. ii, 1840, p. 64.

Black, shining, with the sides of the pronotum and elytra, except the sutural margins, opaque, the lateral margins of the

prothorax, the legs, and parts of the body beneath clothed with long reddish hair.

Flat, rather parallel-sided, not very broad. The *head* is densely rugose in front, with an acute erect median horn, a little laterally compressed, placed just in front of the eyes, and a minute tubercle on each side of it. Between the eyes there is a finely tuberculate area with a rather deep pit in the middle. The *pronotum* is finely and fairly closely punctured, with the basal part smooth, except in the middle, and with a large pit close to the outer margin. The outer margin is strongly rounded, with a slight flattening in the middle, and finely dentate, the front angle is sharply toothed, the front margin minutely toothed in the middle, the hind angle rounded, and the base minutely tuberculate and very obtusely angulate in the middle. There is no visible scutellum. The *elytra* are lightly striate, and the intervals are very minutely and sparsely punctured. The *pygidium* is opaque and minutely and a little more closely punctured. The *meso-* and *meta-sternum* are rather closely clothed with reddish hair, except in the middle of the latter, where there are two rather deep longitudinal excavations. The front femur has a sharp tooth directed upwards near its extremity, the front tibia is armed with four strong external teeth and is finely serrate between and above them, the middle tibia has the tarsus inserted at a little distance from the extremity, and the hind tibia and tarsus have very long fringes.

♂. The pygidium is rather flat and almost vertical.

♀. The pygidium is very convex and protuberant.

Length, 23–30 mm. ; breadth, 12–17 mm.

SIND : Karachi (*F. W. Townsend*). N.W. FRONTIER PROV. : Bannu (*Dr. Pennell*). BALUCHISTAN : Ormarah (*W. D. Cumming*). AFGHANISTAN. S. ARABIA. EGYPT. ABYSSINIA.

5. **Scarabæus andrewesi.** (Plate II, fig. 1.)

Sebasteos andrewesi Felsche,* Deuts. Ent. Zeits. 1907, p. 275.

Black, shining, with the sides of the pronotum and the elytra, except the sutural margins, opaque, the legs and parts of the body beneath fringed with reddish hair.

Rather elongate and parallel-sided, scarcely convex. The *head* is densely rugose in front, with a sharp median tubercle, a little compressed laterally, placed in front of the eyes, and a minute tubercle on each side of it. Between the eyes there is a finely but not densely tuberculate area, with a slight depression in the middle. The *pronotum* is moderately finely and uniformly punctured, without smooth areas. The lateral

* An asterisk after the name of a species indicates that a type or co-type has been examined.

margins are strongly rounded and finely denticulate, the front angle is finely toothed, the front margin not toothed in the middle, the hind angle rounded, and the base minutely tuberculate and very obtusely angulate in the middle. There is no visible scutellum. The *elytra* are very lightly striate and the intervals extremely minutely and sparingly punctured. The *pygidium* is opaque and finely punctured. The lower surface is rather smooth. The *metasternum* has a deep longitudinal pit between the middle coxæ and a shallower one behind it, and the sides are finely punctured and hairy. The front femur has an upwardly directed tooth near the extremity of its inner edge, and the front tibia is armed with four strong external teeth and numerous irregular tubercles along its inner edge; the middle tibia has the tarsus inserted at a little distance from its extremity; and the hind tibia and tarsus have very long fringes.

♂. The pygidium is rather flat and almost vertical.

♀. The pygidium is very convex and protuberant.

Length, 19–34 mm.; breadth, 12–20 mm.

SIND: Karachi (*F. W. Townsend*; *T. R. D. Bell*).

Type in the British Museum.

This bears a very close resemblance to *S. cristatus*, which occurs with it at Karachi, but it can be distinguished by its long front tibiæ, tuberculate at the inner edge.

6. **Scarabæus devotus.** (Plate II, fig. 2.)

Ateuchus devotus Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 515.

Black or very deep blue-black or indigo-black, opaque, with the lower surface, legs, and sutural margins of the elytra shining and with not very long fringes of nearly black hair.

Flat, not very broad, rather parallel-sided. The *clypeus* and *head* are densely and confluently pitted, the clypeal margin armed with four strong teeth. The *pronotum* is very strongly transverse, finely and closely but unevenly granular, the posterior part of the median line and an irregular patch on each side being smooth. The sides are very strongly rounded, crenulate in front, the front angles obtuse, the hind angles entirely obsolete, and the base margined and not tuberculate. The *scutellum* is visible but minute. The *elytra* are lightly striate, and the intervals are feebly and sparsely punctured. The *pygidium* is opaque and finely punctured. The lower surface is very smooth, the sides of the *metasternum* very thinly hairy. The front femur has a feeble tooth beyond the middle of its anterior edge, and the front tibia bears three strong outer teeth and a feeble basal one. The middle and hind tibiæ have each two feeble teeth at the outer edge, and the tarsi are short, without long fringes.

♂. The fringe on the upper surface of the hind tibia is dense in its middle part.

♀. The fringe on the upper part of the hind tibia is evenly spaced and not dense.

Length, 18–25 mm.; breadth, 10·5–16 mm.

PUNJAB. BIHAR: Chapra (*Mackenzie*). BENGAL: Berhampur (*E. T. Atkinson*).

Type in the Vienna Museum.

7. **Scarabæus sanctus.**

Copris sanctus F.,* Ent. Syst., Suppl. 1798, p. 34.

Dark blue, green or coppery above, with the lower surface and legs nearly black, the head, legs, and sides of the thorax bearing nearly black hair.

Broadly oval, shining, strongly punctured above. The *head* is coarsely, densely, and rugosely pitted, with erect short hairs upon the *clypeus*, which is armed at the margin with four teeth separated by sharp notches. The *pronotum* is moderately convex and densely asperately punctured or granular, with a smooth fleur-de-lys-shaped area at the middle of the base. The lateral margins are dentate anteriorly and very strongly rounded, the front angles are very obtuse, the hind angles obsolete, and the base margined and not tuberculate. The *scutellum* is visible. The *elytra* are finely striate, with the intervals coarsely and in part confluently punctured. The lower surface is very shining, with the sides of the *metasternum* very finely and sparingly punctured and thinly hairy. The front femur bears a minute tooth beyond the middle of its anterior edge. The front tibia is armed externally with three long teeth and a minute basal one. The middle and hind tibiæ have each two minute teeth at the outer edge, and the tarsi are short, without long fringes.

♂. The fringe on the upper surface of the hind tibia is very close, except at the extremities, where it is shorter and thinner.

♀. The fringe on the upper surface of the hind tibia is evenly spaced and rather thin.

Length, 21–26 mm.; breadth, 13–15·5 mm.

BOMBAY: Belgaum (*H. E. Andrewes*). BIHAR (*E. A. D'Abreu*). ORISSA: Barkul (*F. H. Gravely*, Aug.). S. INDIA: Sholapur; Bangalore; Nilgiri Hills (*H. L. Andrewes*); Kinavallore (*P. S. Nathan*, June). CEYLON.

Type in the Copenhagen Museum.

8. **Scarabæus erichsoni.** (Plate II, fig. 6.)

Ateuchus erichsoni Har., Col. Hefte, ii, 1867, p. 94.

Dark blue, green or coppery above, with the lower surface and legs darker, the head, legs and lateral margins of the thorax bearing dark hair.

Broadly oval, flat, scarcely shining, and very strongly punctured. The *head* is coarsely, densely, and rugosely pitted, with short erect hairs upon the *clypeus*, which is armed at its front margin with four teeth separated by acute notches. The *pronotum* is scarcely convex, and its lateral margins are rather produced in the middle. The surface is densely, asperately punctured, with one or three very small, smooth, median areas near the base. The lateral margins are subangulate, scarcely rounded, serrate anteriorly; the front angles are very obtuse, the hind angles obsolete, and the base margined and not tuberculate. The *scutellum* is visible. The *elytra* are rather deeply striate, with the intervals very coarsely and confluently punctured. The *pygidium* is rather finely punctured. The lower surface is very shining, with the sides of the *metasternum* finely and sparingly punctured and thinly hairy. The front femur has a minute tooth beyond the middle of its anterior edge. The front tibia is armed externally with three long teeth and a minute basal one. The middle and hind tibiæ have each two minute teeth at the outer edge, and the tarsi are short, without long fringes.

♂. The middle part of the fringe on the upper surface of the hind tibia is very close.

♀. The fringe on the upper surface of the hind tibia is evenly spaced and rather thin.

Length, 21–26 mm.; breadth, 12–15 mm.

MADRAS: Bangalore (*C. D. Gregson*, Aug.); Kodaikanal (*J. Castets*); Podanur (*A. K. Weld Downing*). CEYLON: Colombo; Kandy (*G. E. Bryant*, May); Rangala (*G. M. Henry*, April); Nitre Cave, Medumakanuwara (*G. M. Henry*, April).

Type in M. René Oberthür's collection.

This is very closely related to *S. sanctus*, but more closely and roughly sculptured and less shining above, with only a trace of the trefoil-shaped smooth space at the base of the pronotum found in that form. It should, perhaps, be regarded only as a variety of *S. sanctus*, but I have never seen both forms from the same locality.

Genus GYMNOPLEURUS.

Gymnopleurus Illig., Mag. Ins. vol. ii, 1803, p. 199; Latr., Gen. Crust. et Ins. vol. ii, 1807, p. 78; Lacord., Gen. Col. iii, 1856, p. 73.

TYPE, *Ateuchus flagellatus* F.

Range. E. Europe, Africa, Asia.

Body broad and depressed, with slender legs, all bearing tarsi. Clypeus completely fused with the ocular lobes, the suture only indicated by a sharp raised line on each side. Clypeus produced into two or four short lobes at the front margin. Head behind with a sharp rounded edge closely fitting the emargination of the pronotum.

Pronotum moderately convex, with the front margin deeply excised, the front angles sharp, the hind angles generally blunt, sometimes produced, sometimes almost obsolete, the base feebly rounded or nearly straight. Scutellum invisible. Elytra rather flat, with the sides deeply excised behind the shoulders, exposing the sides of the body beneath.

Front femur massive, with a tooth at the front edge; front tibia armed with three sharp teeth confined to the anterior half and serrate between and above them. Mesosternum extremely short. Metasternum not very large. Middle coxæ strougly oblique, converging behind, where they are only moderately far apart; middle and hind tibiæ curved, each with a strong fixed spur at the extremity. Tarsi filiform, not long, without fringes. Abdomen not greatly reduced, sometimes with a sharp lateral carina, sometimes with the sides rounded at the base, the pygidium transverse.

Antenna 9-jointed, the 3rd joint as long as the 4th and 5th together, the 6th extremely short.

Labrum with the front edge nearly straight and with a median longitudinal tuft of stiff bristles. Mandible long and narrow, with closely fringed tip. Maxilla with a sharply angulate tip externally, the two terminal membranous lobes small, the outer one semicircular; the palpus with a long slender last joint. Mentum slightly bilobed in front, not longer than it is wide; lobes of the ligula far apart, broad and strongly divergent at the end; palpi widely separated, the basal joint a little longer than it is wide, the 2nd globose, the 3rd oval, scarcely shorter than the 2nd.

The two sexes are almost alike, but the males are distinguishable by slight differences in the legs. The front tibia is usually rather longer, less broad, and more strongly curved than that of the female. It may be abruptly inturned at the end (*G. ruficornis* Mots.) or furnished with an almost semicircular emargination at its inner edge (*G. maculosus* Macl.). In certain species the spurs of the front tibiæ, long and sharp in the female, are blunt in the male, generally flat and truncate, or sometimes slightly bifurcate, sometimes strongly bent downwards, and the terminal spine of the hind tibia may be stronger and, with the terminal part of the tibia, more strongly curved than in the other sex.

The most salient feature of the genus is the cutting away of the sides of the elytra, which seems to be a means of facilitating instant flight by allowing the wings to be slipped out rapidly. The possession of front tarsi is another important difference from the genus *Scarabæus*.

The habits of the very abundant insects belonging to this genus are referred to in the introductory part of the volume. They are ball-rollers, like the species of the related genus

Scarabæus, but are more social in their habits. The few species that have been carefully observed work in pairs, which is not the case in the other genus so far as has been ascertained.

The genus has been divided by Garreta, a young entomologist, who, unhappily, lost his life in the Great War, into three subgenera, *Gymnopleurus*, *Paragymnopleurus*, and *Progymnopleurus*, of which the distinctive features are the visibility or otherwise from above of the metasternal epimera, and the appearance of the inner side of the front femur, the two carinæ upon which may be equally or unequally prominent. In both characters the Indian species show a gradual transition from one to the other condition, and I have found it impossible to group the species by their means. There is another feature, however, which has escaped notice, by which two well defined groups are easily recognizable. In one group, containing the large species, the sides of the abdomen show a sharp edge from end to end, and in the other this edge does not reach the base, the broad basal sternite being conspicuously rounded at the side.

Key to the Species of Gymnopleurus.

1	(14)	Sides of the abdomen not carinate at the base.	
2	(5)	Clypeus quadridentate.	
3	(4)	Upper surface without hairy clothing.	*cyaneus* F., p. 49.
4	(3)	Upper surface clothed with fine hairs	*miliaris* F., p. 50.
5	(2)	Clypeus bidentate.	
6	(11)	Upper surface clothed with fine hairs.	
7	(8)	Elytra strongly costate	*koenigi* F., p. 51.
8	(7)	Elytra not strongly costate.	
9	(10)	Pronotum with about six shining spots	*parvus* Macl., p. 52.
10	(9)	Pronotum with about fifteen shining spots	*gemmatus* Har., p. 53.
11	(6)	Upper surface without hairy clothing.	
12	(13)	Upper surface not coarsely pitted....	*bicallosus* Felsche, [p. 54.
13	(12)	Upper surface coarsely pitted	*flagellatus* F., p. 55.
14	(1)	Sides of the abdomen sharply carinate at the base.	
15	(30)	Clypeus quadridentate.	
16	(19)	Upper surface clothed with fine hairs.	
17	(18)	Elytra with longitudinal and transverse shining patches	*spilotus* Macl., p. 55.
18	(17)	Elytra with longitudinal shining patches only	*maculosus* Macl., p. 56.
19	(16)	Upper surface without hairy clothing.	
20	(27)	Upper surface not shining.	
21	(26)	Pronotum with two minute basal impressions.	
22	(25)	Upper surface punctured.	

23 (24)	Pronotum finely and distinctly punctured	*mundus* Wied., p. 57.
24 (23)	Pronotum rather coarsely and indistinctly punctured	*opacus* Redt., p. 58.
25 (22)	Upper surface without punctures	*dejeani* Cast., p. 59.
26 (21)	Pronotum without two basal impressions	*ruficornis* Mots., p. 59.
27 (20)	Upper surface very shining.	[p. 60.
28 (29)	Pronotum very smooth............	*smaragdifer* Walk.,
29 (28)	Pronotum strongly punctured	*sumptuosus* Cast., p. 61.
30 (15)	Clypeus bidentate.	
31 (36)	Upper surface dull.	
32 (33)	Body not very broad, entirely matt above	*biharensis*, sp. n., p. 62.
33 (32)	Body very broad, not entirely matt above.	
34 (35)	Pronotum rounded at the sides.	*æthiops* Shp., p. 62.
35 (34)	Pronotum strongly angulate at the sides	*sinuatus* Oliv., p. 63.
36 (31)	Upper surface very shining.	[p. 65.
37 (38)	Upper surface coarsely punctured ...	*bombayensis*, sp. n.,
38 (37)	Upper surface finely punctured	*sindensis*, sp. n., p. 66.

9. **Gymnopleurus cyaneus.** (Plate III, fig. 6.)

Copris cyaneus F.,* Ent. Syst., Suppl. 1798, p. 34.
Gymnopleurus indicus Cast.,* Hist. Nat. ii, 1840, p. 73.
Gymnopleurus impressus Cast.,* l. c.

Bright, shining, metallic green, blue or violet, with the lower surface rather darker, the antennæ dark, and the body above and beneath almost devoid of hairs or setæ.

Broadly oval and not very convex, with slender legs, the front tibia armed with three strong teeth, occupying rather less than half the outer edge, the remainder of the edge rather strongly serrate, the front edge of the front femur a little flattened or hollowed, with a tooth placed at two-thirds of its length from the base; the middle tibia scarcely, and the hind tibia distinctly, serrate. The *head* is slightly rugose and asperately punctured in front, smooth and deeply punctured behind, the clypeus having four blunt teeth, and the ocular lobes slightly prominent. The *pronotum* is very short and convex, smooth, unevenly and very strongly but fairly sparsely punctured, hollowed and very slightly rugose in the front angles. The sides are strongly rounded, the front angles acutely produced, the hind angles almost obsolete, the base finely margined, with a short longitudinal groove extending a very short distance forward from its middle. The *elytra* show at the base the beginnings of deep sulci which, shortly behind the base, resolve themselves into series of very large and partly confluent pits, the second interval from the suture very broad and showing very large transverse depressions. The lateral margins are very deeply excised. The sides of the *abdomen* are not sharply carinate at the base; the

pygidium has a longitudinal median carina and is a little hollowed on each side and rather rugosely punctured.

♂. The spur of the front tibia is flat, truncate at the end, and rather strongly bent downwards.

♀. The spur of the front tibia is slender and acute.

Length, 8–12 mm.; breadth, 5–8 mm.

U. Prov.: W. Almora; Haldwani, Sitipur (*H. G. Champion*, Aug.); Chakrata, Arakot, 4000 ft. (*B. M. Bhatia*, June); Fyzabad (*R. W. G. Hingston*). Bengal: Dacca, Kumarbhog (*M. Bose*); Calcutta. C. Prov.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June). Bombay: Belgaum (*H. E. Andrewes*). S. India: Coimbatore (*M. S. Pillai*): Yemmiganur, Bellary Distr. (*T. V. Ramakrishna*, Aug.); Dhony Forest, Malabar (*T. V. Ramakrishna*, May); Kannirode, N. Malabar (*Menon*, May, June); C. Comorin (*J. Castets*); Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May). Ceylon: Kanthalai (May).

Type in the Copenhagen Museum, those of *indicus* and *impressus* Cast. in the Oxford University Museum.

Dr. Kai L. Henriksen has kindly compared the type of *G. cyaneus* F. with a specimen sent to him for the purpose.

10. **Gymnopleurus miliaris.** (Plate II, fig. 3.)

Scarabæus miliaris F.,* Syst. Ent. 1775, App. p. 817.

Blue-black, dark green or coppery, with the lower surface black or nearly black, and the upper surface closely clothed with minute grey setæ, bearing a few shining denuded patches, viz., a central spot upon the prothorax, a ring of five spots surrounding it, an outer one on each side and the lateral pit on each side near the last, the basal and apical parts of the sutural interval upon each elytron, two spots adjoining the basal margin of each, one near the middle of the suture on each side, an outer one close to each of the last, and one upon the apical callus.

Moderately broad, not very convex, with slender legs, the front tibia armed with three strong teeth occupying half the outer edge and finely serrate in the upper half, and the middle and hind tibiæ rather coarsely serrate externally. The front femur has two sharp carinæ along its anterior edge, and is slightly hollowed between them, with a minute tooth placed at two thirds of its length from the base. The *head* is densely granulate, and the *clypeus* has four blunt lobes at its front edge. The *pronotum* and *elytra* are also densely granulate, except upon the shining spots enumerated, and the lateral margins of the former are strongly and evenly rounded, the front angles acutely produced, the hind angles bluntly prominent, and the base gently rounded and marked on each side of the middle with a minute impression. The

elytra are finely striate, with the lateral margins deeply excised behind the shoulders, exposing the metasternal epimera, and the sides of the *abdomen* are rounded at the base. The *pygidium* is granular and setose at the base and smooth and shining at the apex.

♂. The front tibia is a little longer and less broad than that of the female, with shorter exterior teeth, and its terminal spur is very blunt.

♀. The terminal spur of the front tibia is strongly curved and very sharp at the end.

Length, 7·5–11·5 mm. ; breadth, 5–8 mm.

N.W. FRONTIER PROV. : Chitral (*B. N. Chopra*, June). KASHMIR : Jhelum R., 5000 ft. ; Sonamarg, 8600 ft. (*T. R. D. Bell*). C. PROV. : Nagpur, 1000 ft. (*E. A. D'Abreu*, July) ; Jubbulpore (*S. H. Ribetro*, June). ORISSA : Puri (*B. N. Chopra*, Oct.). MYSORE ; Bangalore (*T. H. L. Grosvenor*, June). BENGAL : Berhampur (*E. T. Atkinson*). U. PROV. : Fyzabad (*R. W. G. Hingston*). Kakrighat, Naini Tal, 5500 ft. (*C. F. C. Beeson*, May). BOMBAY : Belgaum (*H. E. Andrewes*). BHUTAN. S. INDIA : Tope, foot of Palni Hills (*S. Kemp*, Sept.). CEYLON : S. Prov., Wirawila (July) ; Kelani Valley nr. Colombo (*W. Braine*).

Type in the Glasgow University Museum.

11. **Gymnopleurus kœnigi.** (Plate III, fig. 4.)

Scarabæus kœnigi F., Syst. Ent. 1775, p. 29.

Black and shining, with a clothing of white or pale yellow setæ upon the upper side, chiefly occupying depressions of the surface and forming a conspicuous pattern upon the elytra, composed of two series of elongate patches upon the second, fourth, and sixth intervals, the first just beyond the base and the second before the extremity. There is a third patch upon the second interval close to the hind margin, and also one upon the dorsal (exposed) part of the first abdominal sternite.

Broadly oval and moderately convex. The front tibia is armed with three strong teeth occupying about half the outer margin and coarsely serrate upon the other half, and the front femur is doubly carinate, a little hollowed and not toothed anteriorly. The middle and hind tibiæ are not serrate externally. The *head* is densely granular, with a smooth, elevated, median line and an oblique one on each side at the junction of the clypeus and ocular lobe. The *clypeus* is deeply notched in the middle, forming a fairly sharp single lobe on each side. The *pronotum* is densely and rugosely punctured and clothed (not very densely) with setæ, leaving a smooth, elevated, narrow median line,

dilated a little at the front margin and in the middle, and united with the basal margin by a quadrangular raised line. On each side are three smooth raised spots placed in a triangle, and a deep smooth pit near the outer margin. The pronotum is convex, very transverse, with strongly rounded sides, subangulate in the middle, with the front angles acutely produced and the hind angles nearly rectangular and a little reflexed. The *elytra* are very deeply sulcate, the sulci coarsely and confluently punctured, the intervals shining and convex, except where they bear patches of white setæ, and the second and fourth much broader in front than the rest. The lateral margins are deeply excised, exposing the metasternal epimera. The sides of the *abdomen* are rounded (not carinate) in front, and the *pygidium* is thinly granular and setose, with a smooth median carina.

♂. The spurs of the front tibiæ are flat and truncate, and those of the hind tibiæ a little stouter than in the female.

Length, 7–11·5 mm. ; breadth, 4·5–8 mm.

CEYLON : Colombo (*G. Meade-Waldo*, Dec.), Batticaloa (March) ; Negombo (*G. M. Henry*, Dec.) ; Puttalam. S. INDIA : Madura (*H. E. Andrewes*) ; Pondicherry : Karunagapalli, Travancore (*G. P. Pillai*, May) ; Yercaud, 4600 ft., Salem District, Shevaroy Hills (*H. S. Pruthi*, June) ; Harur, 2000 ft., Salem District (*H. S. Pruthi*, June), Kodur, 600 ft., Cuddapah District (*H. S. Pruthi*, July).

12. **Gymnopleurus parvus.** (Plate III, fig. 2.)

Scarabæus parvus Macl.,* Horæ Ent., 1821, p. 517.

Dark coppery or greenish-black, occasionally steely blue, with the upper surface densely clothed with minute greyish setæ, leaving a few shining denuded spots, viz., three placed in a transverse row along the middle line of the pronotum, one between the median spot and the base, and one on each side between the last and the lateral spot, a common spot at the base of the elytral suture, three along the basal margin, one on each side of the suture a little behind the middle, and one upon each apical callus. The posterior part of the sutural margin is also bare and shining.

Oval in shape and moderately convex, with slender legs. The front tibia is armed with three strong teeth occupying the terminal half of the outer edge, and the basal half is finely serrate. The front femur is flat at its anterior edge and not toothed. The middle and hind tibiæ are coarsely toothed. The *head*, *pronotum*, and *elytra* are finely and densely granular, the *clypeus* produced into two lobes in front, the pronotum highly convex, with the sides strongly rounded, the front angles acutely produced, the hind angles very obtuse and the base gently rounded, with a minute impression on each

side of the middle. The elytra are finely striate, and the lateral margins are strongly excised behind the shoulders, exposing the metasternal epimera. The sides of the *abdomen* are rounded at the base and the *pygidium* is densely granular and setose.

♂. The spur of the front tibia is flat, truncate at the end, with sharp angles.

♀. The spur of the front tibia is long, slender, and sharply pointed.

Length, 7–8 mm. ; breadth, 5–6 mm.

U. PROV. : Dehra Dun (*C. F. C. Beeson*, June). MADRAS : Javadi Hills, Nadur, 1800 ft. (*H. S. Pruthi*, June). BENGAL : Berhampur (*E. T. Atkinson*). BIHAR : Chapra (*Mackenzie*). S. CEYLON : Hambantota (*T. Bainbrigge Fletcher*, Feb.).

Type in the British Museum.

13. **Gymnopleurus gemmatus.** (Plate III, fig. 1.)

Gymnopleurus gemmatus Har., Col. Hefte, viii, 1871, p. 117.
Scarabæus granulatus F.* (nec Oliv.), Ent. Syst. i, 1792, p. 65.

Black, with the upper surface closely clothed with minute grey setæ, leaving numerous shining bare patches, viz., upon the pronotum, a central spot, five adjoining the front margin, four adjoining the hind margin, and three or four on each side, and, upon the elytra, the sutural margins, a common transverse irregular patch at the middle and a smaller common patch behind it just before the apices, three spots adjoining the basal margin on each side, one near the middle of the outer margin, and one upon the apical callus.

Oval in shape, not very convex, with slender legs, the front tibia armed with three strong teeth occupying the terminal half of the outer edge and finely serrate in the upper half, and the middle and hind tibiæ rather feebly toothed externally. The front femur has a flattened anterior edge and is not toothed. The *head* is densely granular and the *clypeus* is produced into two blunt lobes in front. The *pronotum* is granular except upon the smooth elevated patches, its sides are straight in front, strongly rounded behind, the front angles are acutely produced, the hind angles bluntly prominent, and the base feebly rounded, with a slight oblique depression on each side of the middle. The *elytra* are irregularly rugose, finely striate, and very deeply excised at the sides. The sides of the *sternum* and *abdomen* are clothed with recumbent grey setæ, the *abdomen* is rounded laterally at the base and the *pygidium* is closely punctured, setose at the base and bare at the apex.

♂. The front tibia is longer and narrower than that of the ♀, a little bent before the end, feebly serrate internally, and

armed with shorter teeth externally. The terminal spur is bent at the end and rather blunt.

♀. The front tibial spur is slender, curved, and very acute.

Length, 6–9 mm.; breadth, 4–6·5 mm.

BOMBAY: Belgaum (*H. E. Andrewes*). BENGAL: Berhampur (*E. T. Atkinson*). U. PROV.: Suswa R. (*C. F. C. Beeson*, Nov.). CHOTA NAGPUR: Chakradharpur, Singbhum District (*F. H. Gravely*, March). C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June, Aug.); Jubbulpore (*S. H. Ribetro*, June). S. INDIA: Bangalore (*T. H. L. Grosvenor*, June); Travancore, C. Comorin (*J. Castets*); Madras City (*M. O. T. Iyengar*, April); Pondicherry. CEYLON: Kanthalai (June).

Type of Fabricius in the Copenhagen Museum. Harold has only renamed this species.

Found in cattle-dung.

14. Gymnopleurus bicallosus.

Gymnopleurus bicallosus Felsche,* Deuts. Ent. Zeits. 1909, p. 751.

Entirely black, including the antennæ, very opaque above, a little more shining beneath, with a very minute inconspicuous clothing of yellow setæ (sometimes absent).

Small and rather elongate in shape, with slender legs. The front tibia is armed with three teeth, occupying the terminal half of the outer edge, and the basal half is serrate. The front femur is doubly carinate and a little hollowed along its anterior edge, and has a sharp oblique tooth placed at two-thirds of its length from the base, and the middle and hind tibiæ are strongly toothed at the outer edge. The *head* is uniformly granulate, with the clypeus excised in the middle and produced into two blunt reflexed lobes. The *pronotum* is convex, very finely and densely granulate behind, more coarsely and distinctly in front and at the sides, with a large transverse pit on each side and a short median longitudinal groove at the base. The lateral margin is straight for two-thirds of its length, then roundly angulate, and again straight to the hind angle, which is extremely obtuse. The *elytra* are finely striate, with distinct but not very numerous punctures in the striæ, the intervals granulate, the 1st, 3rd, 5th, and 7th a little more elevated than the rest, the 2nd rather wide and having about four large vague depressions in its median part. The lateral margins are deeply excised. The sides of the *abdomen* are rounded, not carinate, and the *pygidium* is sparingly granulate and moderately shining.

♂. The front tibia is more elongate, and its teeth are shorter than in the female.

Length, 8–11·5 mm.; breadth, 5–7 mm.

SIND: Karachi (*M. Maindron*, Aug., Sept.).

Type in the Dresden Museum.

15. **Gymnopleurus flagellatus.** (Plate III, fig. 5.)

Scarabæus flagellatus F., Mant. Ins. 1787, p. 17; Oliv., Ent. i, 3, 1789, p. 162, pl. 7, fig. 51.

Scarabæus coriarius Herbst, Nat. Käfer, ii, 1789, p. 309, pl. 20, fig. 4.

Gymnopleurus hornei Wat.,* Ann. Mag. Nat. Hist. (6) v, 1890, p. 410.

Entirely black, dull and coarsely sculptured above. Oval and not very convex, with the legs not very slender, the front tibia armed with three strong teeth, occupying the terminal half of the outer edge, the front femur with the anterior edge a little flattened, with a minute sharp tooth placed a little beyond the middle, the middle tibia with three external teeth and the hind tibia strongly serrate externally. The clypeus is notched in the middle and forms two rounded lobes in front. The *head* is coarsely and confluently punctured, with two strongly elevated oblique bisinuate carinæ converging behind. The *pronotum* is very coarsely and closely pitted, with an incomplete median smooth longitudinal line. The sides are straight in front and strongly rounded behind, with the front angles acute, the hind angles very obtuse and the base very feebly rounded. The *elytra* are rather vaguely striate, with the intervals broken into irregular shining elevations and opaque depressions. The sides are strongly excised behind the shoulders. The sides of the *abdomen* are rounded, not carinate, and the *pygidium* is finely and not very closely granular. The *metasternum* is vertical anteriorly in the middle, coarsely granular in front, irregularly pitted behind, and opaque and finely granular at the sides.

♂. The front tibia is longer, with shorter teeth, than in the ♀ and the terminal spur is blunt.

Length, 9–13 mm.: breadth, 5–9 mm.

Kashmir: Harwan, Pohru Valley, 6000 ft. (*C. F. C. Beeson*, May). Baluchistan: Gwal Forest, 6000 ft. (*W. H. Evans*, Mar.); Armarah (*W. D. Cummings*). Waziristan (*Rev. G. Palacios*, March, April). Afghanistan. Persia. Palestine. Morocco. Turkestan. Caucasia. Spain. S. France.

Type ? in the Copenhagen Museum; that of *hornei* Wat. in the British Museum.

16. **Gymnopleurus spilotus.** (Plate III, fig. 8.)

Scarabæus spilotus Macl., Horæ Entom. i, 1821, p. 517.

Blue-black, with a clothing of minute recumbent greyish setæ, rather scanty upon the lower surface and legs and close upon the upper surface, but with small denuded patches, viz., a short transverse pit, partially divided in the middle, near each lateral margin of the pronotum, and numerous shining elevated spots, from 9 to 13 of them upon the pronotum,

one near the middle, two in front of the middle, three behind it, and two at the base, and usually three adjoining the front margin and one near each front angle. Upon the elytra there are generally four similar shining spots along the basal edge of each, numerous minute spots along the 1st, 3rd, and 5th intervals, uniting into a common longitudinal bar upon the posterior part of the 1st interval, and rather larger spots near the middle of the 2nd, 4th, 6th, and 8th (external) intervals.

Oval in shape and moderately convex, with slender legs. The front tibia has three strong teeth, occupying nearly half the outer edge, the remainder serrate: the inner edge of the front femur is not sharp but rather broadly flattened, with a feeble tooth at two-thirds of its length from the base; the middle tibia feebly, and the hind tibia minutely, serrate at the outer edge. The *clypeus* is armed with four pointed processes, and the ocular lobes are prominent but blunt. The *pronotum* is very convex, with a slight longitudinal median groove behind, and its lateral margins are strongly and evenly rounded, with the front angles acutely produced and the hind angles entirely obsolete. The *elytra* are very finely striate and their lateral margins deeply excised, exposing the metathoracic epimera. The sides of the *abdomen* are straight and sharply carinate to the base. The *pygidium* is closely clothed with minute grey setæ.

♂. The front tibia is rather broad and has a short, sometimes rather deep, rounded excision of its inner edge just before the extremity. The terminal spur is flat and bifid or truncate at the end.

Length, 11–14 mm.; breadth, 7–9 mm.

BENGAL: Berhampur (*E. T. Atkinson*). BIHAR: Ghorakatora (*E. A. D'Abreu*, June). S. INDIA: Kodaikanal, Palni Hills, 6000 ft.; Nilgiri Hills (*H. L. Andrewes*); Anaimalai Hills; Madura; Bangalore (*T. H. L. Grosvenor*, May, June; *C. F. C. Beeson*, Aug.).

Type in the Macleay Museum, Sydney.

17. Gymnopleurus maculosus.

Scarabæus maculosus Macl.,* Horæ Ent. i, 1821, p. 517.
Gymnopleurus exanthema Wied.,* Zool. Mag. ii, 1, 1823, p. 22.

Bluish- or greenish-black, occasionally coppery, with a clothing of recumbent greyish setæ, rather scanty upon the lower surface and legs and fairly close upon the upper surface, but with numerous small, denuded, shining patches, viz., a short transverse pit, partially divided in the middle, near each lateral margin of the pronotum, a small median spot, two at a short distance from it on each side, another just behind, and two contiguous to the basal margin, a juxta-

sutural row of similar spots upon each elytron, and two or three other rather ill-defined rows upon each.

The shape is oval and moderately convex and the legs are fairly slender. The *front tibia* has three strong teeth occupying not quite half the outer edge, the remainder of which is serrate, and the front femur is rather broadly flattened at the front edge, with a minute tooth placed at two-thirds of its length from the base; the middle tibia has three or four teeth; and the hind tibia is closely serrate along the outer edge. The *head* is closely granular and setose, the *clypeus* is produced into four blunt lobes, and the ocular lobes are very bluntly prominent. The *pronotum* is convex, with a slight longitudinal median groove behind, the sides are straight in front and strongly rounded behind, with the front angles acutely produced and the hind angles very obtuse. The *elytra* are faintly striate, and their lateral margins are deeply excised, exposing the metathoracic epimera. The sides of the *abdomen* are sharply carinate to the base, and the *pygidium* is minutely and not very closely granular and thinly clothed with setæ.

♂. The front tibia is rather long, slightly bent before the middle, and exhibits an indentation of the inner edge just before the extremity, sometimes large, semicircular, and conspicuous. The terminal spur is truncate.

Length, 13–15 mm.; breadth, 7·5–9 mm.

NEPAL (*Maj.-Gen. Hardwicke*). UNITED PROV.: W. Almora, Kumaon (*H. G. Champion*). BOMBAY: Belgaum. C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June). S. INDIA: Malabar.

Type in the British Museum, that of *exanthema* Wied. in the Copenhagen Museum.

18. Gymnopleurus mundus.

Gymnopleurus mundus Wied.,* Zool. Mag. i, 3, 1819, p. 162.

Dull opaque steely blue, olive-green, or nearly black, entirely devoid of hairy clothing, with the lower surface and legs black or greenish-black and moderately shining.

Broadly oval and not very convex, with slender legs. The front tibia is armed with three strong teeth, which do not extend to the middle of the outer edge, and the remainder of that edge is finely serrate. The inner edge of the front femur is narrowly flattened, and there is a minute tooth placed at two-thirds of its length from the base. The outer edge of the middle tibia is finely toothed and that of the hind tibia finely serrate. The *head* is finely granular, with the *clypeus* cleft in the middle of the front edge and produced into four lobes, and the ocular lobes slightly prominent. The *pronotum* is finely punctured, with the interstices minutely coriaceous. The sides are evenly rounded, the front angles

acute and the hind angles very obtuse. The base is feebly curved and has a minute punctiform impression on each side of the middle. The *elytra* are very finely striate, the striæ scarcely perceptibly punctured, and the intervals finely coriaceous and unpunctured. The lateral margins are strongly excised, and the sides of the *abdomen* are sharply carinate to the base. The *pygidium* is very finely granular.

♂. The spur of the front tibia is broad and bifid at the end, and the hind tibia is a little more strongly curved than in the female and produced at the end.

♀. The spur of the front tibia is long and acute.

Length, 14–17 mm.; breadth, 8·5–11 mm.

BIHAR: Chapra. S.W. CHINA.

Type in the Hamburg Museum.

19. Gymnopleurus opacus.

Gymnopleurus opacus Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 516.

Black, with a slight greenish or bluish tinge on the upper surface, the lower surface moderately shining and the upper surface entirely rough and opaque.

Broadly oval and not very convex, the legs slender, the front tibia bearing three strong teeth upon the distal end and the remainder of the outer edge armed with about six or eight not very fine serrations, the front femur bearing a tooth at the middle of its front edge, which is a little flattened and not sharply carinate, the outer edge of the middle tibia rather feebly, and that of the hind tibia strongly, serrate. The *head* is closely granular and armed in front with four blunt teeth. The *pronotum* is coriaceous, with minute irregular granules traceable in the anterior part and shallow confluent punctures in the posterior part. It is convex, with the lateral margins strongly rounded, the front angles acute, the hind angles very obtuse, and the base has a minute punctiform impression on each side of the middle. The *elytra* are closely and finely granulate, and bear fine minutely punctured striæ. The lateral margins are strongly excised, the sides of the *abdomen* form straight sharp carinæ extending to the base, and the *pygidium* is finely coriaceous.

♂. The front tibiæ are sinuous and rather abruptly incurved at the end: their spurs are truncate but not short, and the hind tibiæ are strongly curved at the end.

Length, 13–16 mm; breadth, 9–11 mm.

U. PROV.: W. Almora, Kumaon (*H. G. Champion*, May, Aug.); Berinag, 3000–6000 ft. (*R. N. Parker*, July); Mussoorie, 6000–7000 ft. (*Col. Harcourt*, July). PUNJAB: Patharnala, Jubbul, Simla, 8000 ft. (*B. M. Bhatia*, Sept.).

Type in the Vienna Museum.

20. **Gymnopleurus dejeani.** (Plate III, fig. 11.)

Gymnopleurus dejeani Cast., Hist. Nat. ii, 1840, p. 70.
Gymnopleurus inconspicuus Wat.,* Ann. Mag. Nat. Hist. (6) v, 1890, p. 371 (new syn.).

Dark coppery red or greenish-black and entirely dull above, with the lower surface and legs bluish- or greenish-black and moderately shining.

Very broad and flat, with slender legs. The front tibia bears three strong teeth, not reaching the middle of the outer margin, the remainder of the edge serrate. The basal half of the anterior edge of the front femur is sharply carinate, the terminal half flattened, and there is a sharp tooth between the two halves. The outer edge of the middle tibia is slightly toothed and that of the hind tibia finely serrate. The *head* and *pronotum* are closely and finely granulose, the *clypeus* rugose in front and produced into four lobes at the front margin. The sides of the *prothorax* are rounded, the front angles acute, the hind angles very obtuse, and the base is almost straight, with a slight impression on each side of the middle. The *elytra* are rather faintly striate, the striæ unpunctured, the intervals rather more finely and less closely granular than the pronotum and without punctures. The lateral margins are rather deeply excised behind the shoulders, exposing the metasternal epimera. The sides of the *abdomen* are sharply carinate to the base, and the *pygidium* is finely coriaceous and dull.

♂. The front tibia is longer than that of the female, more strongly but less regularly curved, and less dilated from base to apex. There is a slight internal prominence at the extremity, and the terminal spur is short and broad, a little dilated at the end, with its outer angle acuminate.

Length, 14·5–20 mm.; breadth, 10–12·5 mm.

C. Prov.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June). U. Prov.: Mussoorie, 6000–7000 ft. (*Col. Harcourt*, July). Central India: Mhow. S. India: Nadur, Javadi Hills, 1800 ft. (*H. S. Pruthi*, June); Malabar; Trivandrum (May).

Type unknown; that of *inconspicuus* in the British Museum.

21. **Gymnopleurus ruficornis.**

Gymnopleurus ruficornis Mots., Etudes Ent. iii, 1854, p. 63.
Gymnopleurus subtilis Wat.,* Ann. Mag. Nat. Hist. (6) v, 1890, p. 372 (new syn.).

Sooty black above and a little more shining beneath, or very dark coppery red, with the front part of the head, the legs and underside black or almost black.

Very broadly oval, slightly convex, with long and slender legs, the front tibia armed with three teeth occupying rather

more than one-third of the outer edge, the remainder coarsely serrate. The front femur is not sharply carinate, but narrowly flattened along its anterior edge, and bears a rather sharp tooth a little beyond the middle; the middle tibia with three strong external teeth towards the end, and the hind tibia strongly serrate externally. The *head* is finely and closely granular, the *clypeus* acutely notched in the middle and bearing four rounded lobes. The *pronotum* and *elytra* are minutely and densely granular, the sides of the former are rounded, the front angles moderately prominent and the hind angles obtuse. The elytra are lightly and inconspicuously striate, the lateral margins strongly excised, exposing the metasternal epimera. The sides of the *abdomen* are sharply carinate from the base, and the *pygidium* is densely granular and opaque.

♂. The front tibia is slender and strongly curved, with a double lobe at its extremity, projecting inwards and downwards. The terminal spur is flat, broad, and bifid at the end.

♀. The front tibia is very broad, with very strong teeth, and the terminal spur is acute.

Length, 14–19 mm.: breadth, 9–12·5 mm.

U. PROV.: Mussoorie (*J. C. M. Gardner*, June). PUNJAB: Burhan (*T. H. L. Grosvenor*, March). ASSAM. S.W. CHINA: Yunnan.

Type ? in the Leningrad Museum; that of *subtilis* Wat. in the British Museum.

22. **Gymnopleurus smaragdifer.** (Plate III, fig. 13.)

Gymnopleurus smaragdifer Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208.

Dark blue or greenish-blue, very smooth and shining.

Very broadly oval and rather convex, with slender legs. The front tibia is armed with three strong external teeth not nearly reaching the middle, the upper part of the outer edge sharply serrate, and the front femur slightly flattened anteriorly, with a minute tooth placed a little beyond the middle. The middle tibia is feebly toothed, and the hind tibia minutely serrate at the outer edge. The *head* is granulate and opaque, with the *clypeus* acutely notched in the middle, and the margin produced into four blunt teeth. The *pronotum* and *elytra* are very smooth and shining, the former very finely but not very closely punctured, except in the region of the front angles, where it is minutely rugose and opaque. The lateral margins are strongly rounded, the front angles almost right angles and the hind angles very obtuse, the base feebly rounded, with a slight transverse depression on each side of the middle, producing a faint angulation. The elytra are very finely striate, the lateral margins strongly excised behind the

shoulders, exposing the metasternal epimera. The base of the *abdomen* is sharply carinate at the sides and the *pygidium* is finely coriaceous and subopaque.

♂. The extremity of the front tibia is abruptly incurved and truncate, and the terminal spur is broad and truncate at the end, with the angles a little produced.

Length, 17–18 mm. ; breadth, 11–12 mm.

CEYLON : Maha Illuppalama (*E. E. Green*, Jan.) ; Negombo (*G. M. Henry*, Dec.).

Type in the British Museum.

23. **Gymnopleurus sumptuosus.** (Plate III, fig. 14.)

Gymnopleurus sumptuosus Cast.,* Hist. Nat. ii, 1840, p. 71.
Gymnopleurus splendens * id., l. c. (new syn.).

Bright metallic green, golden-green, blue or violet above, with the lower surface darker or black. Sometimes the head and pronotum are golden-red or coppery and the elytra green.

Very broadly oval, moderately convex above, with slender legs, the front tibia armed with three external teeth occupying more than one-third of the outer edge, the remainder of the edge finely serrate, the front femur having a flat anterior edge, with a minute tooth placed near the middle, the middle and hind tibiæ minutely serrate at the outer edge. The *head* is finely coriaceous, opaque, and rather closely asperately punctured, with a long and sharp oblique carina on each side, occupying the suture between clypeus and ocular lobe, the *clypeus* with four rounded lobes and the ocular lobes slightly prominent. The *pronotum* is strongly and closely punctured, moderately shining upon the disc and subopaque at the sides and front margin, the lateral margins uniformly rounded, the front angles acutely produced, and the hind angles obtuse. There is an almost obsolete longitudinal median sulcus upon the posterior part of the disc, a large and deep transverse pit on each side, and a minute punctiform impression at the base on each side of the middle. The *elytra* are shining on the disc and subopaque at the sides, distinctly striate, with fine and rather sparse punctures upon the intervals, which are also transversely wrinkled in their median part. The outer margins are strongly excised, exposing the metasternal epimera, the sides of the *abdomen* are sharply carinate to the base, and the *pygidium* is finely granular and opaque, except at the apex, where it is smooth and finely punctured.

♂. The front tibia is serrate at the inner as well as the outer edge, rather sharply incurved at its extremity, and its spur is flat and truncate.

Length, 13·5–20 mm. ; breadth, 9–13 mm.

BOMBAY : Gogo, Kathiawar. CENTRAL INDIA : Mhow. S. INDIA : Deccan (*Col. Sykes*).

Types of *G. sumptuosus* and *splendens* Cast. in Oxford University Museum.

The locality " Nubie " given by Castelnau for *G. splendens* was apparently a misreading of " Mihi " on Hope's label.

24. **Gymnopleurus biharensis**, sp. n.

Very dark bluish- or greenish-black, opaque, with the lower surface and legs very feebly shining and the upper surface finely coriaceous.

Oval, not convex and not very broad, with the legs fairly slender. The front tibia is armed with three teeth, occupying less than half its upper edge, and the upper part is finely serrate. The front femur is flattened along its front edge, which bears a minute tooth at about two-thirds of its length from the base. The middle tibia has three distinct teeth at its outer edge, and the hind tibia is finely serrate. The head and pronotum bear shallow and indistinct scattered punctures, and the former has a rather feeble oblique carina on each side; the *clypeus* is produced in front into two pointed lobes. The *pronotum* has an extremely fine impressed median line in the posterior part, the lateral margins are straight in front, strongly rounded behind, the front angles acute, and the hind angles very nearly obsolete. The *elytra* are very finely and distinctly striate, with the sides very deeply excised behind the shoulders, exposing the metasternal epimera. The *pygidium* is finely coriaceous, like the pronotum, and the sides of the abdomen are sharply carinate in front

♂. The front tibia is longer and more slender than that of the female, with the lateral teeth smaller and closer together, and the terminal spur shorter and blunt.

♀. The front tibia is broad, with the three lateral teeth strong, occupying nearly half the length, and the terminal spur slender and sharp.

Length, 13–15 mm. ; breadth, 8·5–10 mm.

BIHAR : Chapra (*Mackenzie*).

Type in the British Museum ; co-types in the Pusa Collection.

25. **Gymnopleurus æthiops.** (Plate III, fig. 9.)

Gymnopleurus æthiops Sharp, Col. Hefte, xiii, 1875, p. 34.

Black and moderately shining, with the antennal club bright yellow.

Very short and broad, rather convex above and very smooth, with slender legs, except the front pair, of which the front tibia is rather broad, armed with three strong teeth

occupying one-third of the outer edge, the remainder of the edge strongly serrate, the inner edge nearly straight in both sexes. The anterior edge of the front femur forms a sharp rounded carina from the base to the tooth, which stands at two-thirds its length from the base, and is a little hollowed from there to the extremity. The middle and hind tibiæ are rather feebly serrate externally. The *head* and *pronotum* are very *smooth*, but the former is finely granulate at the sides. It is notched in front, forming two rounded clypeal processes. The *pronotum* and *elytra* have a satiny gloss, and the former is convex, its sides are very obtusely angulate in the middle, the front angles acutely produced, the hind angles obtuse, and the base rounded. The elytra are extremely finely and feebly striate and strongly excised at the sides, exposing the meta-sternal epimera. The sides of the *abdomen* are sharply carinate from the base, and the *pygidium* is sooty and opaque.

♂. The spur of the front tibia is broad and flat, obliquely truncate at the end, with its outer angle sharply produced.

Length, 16–20 mm. ; breadth, 11–14 mm.

CEYLON : Battaramulla, W. Prov. (*G. M. Henry*, Feb.) ; Kandy (*G. E. Bryant*, June ; *E. E. Green*, July) ; Wellawaya (*G. M. Henry*, Jan.) ; Kelani Valley (*W. Brain*) ; Balangoda, 1770 ft. (*G. Lewis*, Mar.). MADRAS : Cochin (Sept., Madras Mus.) ; Nilgiri Hills (*G. F. Hampson*) ; BOMBAY : N. Kanara (*T. R. D. Bell*) ; Nedungayam, Nilambur (*S. K. Pillai*, May). N. BURMA : Pouk, 618 ft. (*Miss Molesworth*, Sept.) ; Pecangai, 200 ft. (*Miss Molesworth*, Dec.). BURMA : Bhamo (*L. Fea*, June) ; Minhla (*Comotto*) ; Rangoon (*E. T. Atkinson*). SIAM. FORMOSA. HONGKONG.

Type in M. René Oberthür's Collection.

26. **Gymnopleurus sinuatus.** (Plate III, fig. 12.)

Scarabæus sinuatus Oliv., Entom. i, 3, 1789, p. 160, pl. 10, fig. 93, pl. 21, fig. 189.

Gymnopleurus morosus Fairm., Ann. Soc. Ent. France, (6) vi, 1886, p. 319 ; Bates, Entom. xxiv, 1891, Suppl. p. 73.

Gymnopleurus (subg. *Progymnopleurus*) *sinuatus* Garreta, Bull. Soc. Ent. France, 1914, p. 52.

Var. *Gymnopleurus assamensis* Wat.,* Ann. Mag. Nat. Hist. (6) v, 1890, p. 411.

Black or very dark coppery black, entirely opaque above, with the club of the antenna bright yellow.

Rather broad and flat, with long and slender legs, the front tibia armed with three acute teeth placed close together in the terminal third of the tibia, the remaining two-thirds finely serrate, the front femur with a small tooth placed at about three-fourths of its length from the base, the front edge forming a single sharp curving carina from the base to the

tooth, and flattened and a little hollowed from the tooth to the extremity, the lower half of the external carina of the middle tibia loosely, and of the hind tibia closely, serrate. The *head* is broad and rugosely granular, with the *clypeus* acutely notched in the middle and produced into an acute or rounded tooth on each side, the sides nearly straight, without lateral teeth or ocular lobes. The *pronotum* is feebly convex, finely and fairly closely punctured, the lateral margins not rounded but abruptly angulate in the middle and nearly straight to the front and hind angles, strongly convergent to the former, which are sharply rectangular, and parallel to the latter, which are flattened and slightly blunted. The elytra are very finely striate, with minute remote punctures, the intervals flat and coriaceous. The lateral margins are strongly excised, exposing the metasternal epimera, as well as the base of the *abdomen*. The sides of the latter are completely and sharply carinate, and the *pygidium* is coriaceous and minutely and sparsely punctured.

♂. The hind angles of the pronotum form slightly produced lobes, the front tibia is a little elongate, with a slight internal lobe at the end, and the terminal spur is truncate and bidentate at the end. The hind tibia is strongly curved at its extremity.

♀. The front tibia is a little broader, and its terminal spur is slender and acute.

Length, 14–21 mm. ; breadth, 9–14 mm.

MADRAS : Sappal, Palghat, 1700 ft. (*J. C. M. Gardner*, May) ; Amarampallam R., Nilambur (*C. F. C. Beeson*, May). S. BOMBAY : Kanara (*T. R. D. Bell*).

Var. **assamensis**.

Specimens from the Himalayan region are coppery red above, and the surface is rather more shining than in the typical phase. In large males of this variety the hind angles of the prothorax may be produced a little outward.

NEPAL : Chitlong. UNITED PROV. : W. Almora (*H. G. Champion*, June) ; Dehra Dun ; Jhajra (*B. M. Bhatia*, June, July). SIKKIM : Rungeet Valley, 700–800 ft., Darjeeling District (*F. H. Gravely*, May) ; Sukna, 500 ft. (*N. Annandale*, July) ; Pashok, 2000 ft. (*F. H. Gravely*, May, June) ; Gopaldhara, Rungbong Valley (*H. Stevens*). ASSAM : Naga Hills, 3000 ft. (*S. N. Chatterjee*, April) ; Patkai Hills (*W. Doherty*). BURMA : Shan Hills (*J. C. Brown*) ; Momeik (*W. Doherty*) ; Ruby Mines (*W. Doherty*) ; Maymyo (*H. L. Andrewes*).

Type in the British Museum.

The late Dr. Annandale found specimens in rotten fruit.

27. **Gymnopleurus bombayensis**, sp. n. (Plate III, fig. 7.)

Dark blue, shining, without hairy clothing. Oval, moderately convex, with the legs fairly slender. The front tibia is armed with three strong teeth, occupying less than half its outer edge, and the upper part is finely serrate. The front femur is narrowly flattened along its front edge, which bears a minute sharp tooth at about two-thirds of its length from the base. The middle tibia has two teeth near the end of the outer edge, and the hind tibia is finely serrate. The *head* is strongly and rather closely punctured, with two sharp, oblique, lateral carinæ converging towards the vertex, and the *clypeus* is produced into two blunt lobes in front. The *pronotum* is very strongly and unevenly punctured, closely in front, confluently at the sides, and less closely behind, with an incomplete median longitudinal smooth line continued behind by a fine median stria, a small irregular smooth patch on each side, and a deep impression in the middle of the base. The lateral margins are straight in front, strongly rounded behind, with the front angles acute and the hind angles almost obsolete. The *elytra* are distinctly striate, with the intervals not punctured but divided by transverse depressions into irregular blister-like elevations, and the sides are very deeply excised behind the shoulders, exposing the metasternal epimera. The sides of the *abdomen* are sharply carinate in front, and the *pygidium* is strongly and rather closely punctured.

♂. The front tibia is a little longer and less tapered at the base, and the terminal spur is very blunt and rather abruptly bent or hooked at the end.

♀. The front tibia is shorter, broader at the end, and more tapering at the base, and its terminal spur is gently curved and sharply pointed.

Length, 12·6–16 mm.; breadth, 8–9·5 mm.

BOMBAY: Belgaum (*H. E. Andrewes*). BALUCHISTAN, 5000–8000 ft. (*J. W. Evans*, July).

Type in the British Museum.

Although differing in many structural points, this has a rather close resemblance to *G. cyaneus* F. The bilobed clypeus and carinate sides easily separate it; but, in addition, it is rather larger, the elytra are without definite punctures, and those of the pronotum are much more numerous and less large.

This species has been known for nearly a century, and there are half a dozen examples of it in the British Museum Collection, but the single specimen taken by Mr. Andrewes is the only one of which the actual habitat is known. Another specimen is labelled "Ind. Cent.," and a third was received from the Quetta Museum.

28. Gymnopleurus sindensis, sp. n.

Dark blue, very shining, with the upper surface greenish-blue, smooth, and without hairy clothing.

Oval, not very convex, with the legs fairly slender. The front tibia is armed with three strong teeth, occupying less than half its outer edge, and the upper part is finely serrate. The front femur is narrowly flattened at its front edge, which bears a minute sharp tooth at about two-thirds of its length from the base. The middle tibia has two teeth towards the end of the outer edge, and the hind tibia is finely serrate. The *head* is fairly strongly punctured behind, and the *clypeus* and ocular lobes are closely tuberculate, with a smooth median longitudinal ridge. The *clypeus* is bilobed in front. The *pronotum* is finely, sparsely, and unevenly punctured in the middle, rather more strongly and closely towards the sides, which become rugulose externally. There is a longitudinal median stria, fairly deep behind, but disappearing before the front margin. The lateral margins are straight in front, strongly rounded behind, the front angles are acute, and the hind angles obtuse. The *elytra* are very finely striate, and the intervals extremely sparsely and minutely punctured, with a few blister-like elevations. The sides are deeply excised behind the shoulders. The *pygidium* is very finely punctured, and the sides of the *abdomen* are carinate in front.

♀. The terminal spur of the front tibia is curved and acute.

The male is unknown.

Length, 14 mm. ; breadth, 8 mm.

SIND : Karachi (*Comm. E. R. Shopland*).

Type in the British Museum.

The type is unique.

Division II. SISYPHINI.

The body is short and rather globose, with exceedingly long and slender legs, the posterior part of the prothorax and the abdomen rather compressed, the latter very short, and the elytra tapering to the apex. The metasternum is very broad, and the middle coxæ are parallel and very far apart. The middle and hind tibiæ are slender and not dilated at the end, the middle ones with two terminal spurs and the hind with one. The tarsi are filiform, with the first joint much longer than the next, and the 2nd, 3rd, and 4th similar.

The males are never horned, but in many species show remarkable peculiarities in the legs.

The only genus is *Sisyphus*, one of the most distinctive and unmistakable of all the genera of COPRINÆ.

Genus SISYPHUS.

Sisyphus Latr., Gen. Crust. et Ins. ii, 1807, p. 79; Lacord., Gen. Col. iii, 1856, p. 72; Arrow, Ann. Mag. Nat. Hist. (9) ix, 1927, p. 456.

TYPE, *Scarabæus schaefferi* L.

Range. Europe, Africa, Mauritius, India, China, Malay Archipelago, and Central America.

Spider-like in form, the body subglobose, compressed laterally, with very long and loosely articulated posterior legs, the body usually clothed above with short, erect, hooked setæ and more or less smooth beneath.

Front legs fairly short, the femur massive, the tibia armed with three external teeth and serrate between and above them, the tarsus short and very slight. Middle and hind legs very long and slender, the middle coxæ longitudinal, parallel and very far apart, the femora slender at the base, thickened before the end, middle tibia curved, middle tarsus longer than the tibia, hind tibia very long and slender, serrate at the inner edge, the tarsus long, basal joint of the middle and hind tarsi as long as the 2nd and 3rd together.

Head broad and flat, the clypeus completely fused with the ocular lobes and furnished with two or four short teeth at its front margin, the ocular lobes usually also slightly prominent, the vertex bearing a sharply defined horizontal lobe exactly fitting the emargination of the prothorax.

Antenna short, 8-jointed, the 3rd joint very slightly elongate, the 4th and 5th very short.

Labrum nearly straight at the front margin. Mandible small, forming a narrow membranous lobe, with a highly chitinous broad base. Maxilla membranous internally, with semicircular outer lobe; palpus with long terminal joint. Mentum slightly elongate, parallel-sided, shortly bilobed, thickly clothed with very long bristles, the ligula very thick and fleshy, with two long and narrow lobes, the labial palpi bearing very long bristles.

Prothorax strongly compressed behind, hollowed beneath the front angles, the flattened lateral area generally hollowed and very sharply defined, producing a sharp angulation of the lateral margin near the middle. Scutellum not visible. Elytra very short, narrowing rapidly from shoulders to apices and not excised behind the former.

Mesosternum broad and flat, separated by a straight suture from the metasternum. Metasternum broad and flat between the middle coxæ, generally hollowed behind. Abdomen laterally compressed, with the pygidium long and narrow.

This is one of the nost peculiar and distinctive of all the genera of COPRINÆ, its rotund body and disproportionately long legs producing a spider-like form which contrasts strongly with the depressed form of the other slender-legged genera, *Scarabæus* and *Gymnopleurus*. The middle and hind legs of many species bear remarkable processes which may be common to both sexes or peculiar to the male. In some of the species the hind trochanters also undergo an extraordinary elongation in the males. The curious hooked setæ clothing the body are evidently designed to entangle and retain the fibrous excrementitious matter with which the beetles work, either for the purpose of disguise or to facilitate its transport. Owing to the compression of the body and the loose articulation of the very long posterior legs, the latter can be brought over the back, perhaps to remove and manipulate the material retained by the hooks, or, as has been observed in the case of another genus, *Eurysternus*, to hold it there for transport. Like *Scarabæus* and *Gymnopleurus*, *Sisyphus* is a genus of ball-rollers. The European representative, *S. schaefferi*, according to Fabre, works in couples at the rolling operation, and the ball is eventually buried, but Sir Guy Marshall found that a South African species, *S. quadricollis*, attached its ball to a grass-stem instead of burying it. According to Lacordaire, these insects fly without raising the elytra. This is rendered possible by the reduction of the lateral part of the latter, which are without epipleuræ, although not excised as in *Gymnopleurus*. Specimens of *S. longipes* and a few other species are often found with an incrustation of a white chalky matter which seems never to cover the surface, but forms a more or less regular pattern at the sides. Its actual nature and significanee are not known.

The distribution of *Sisyphus* is remarkable. The species are rather numerous in Africa, and about a dozen are known from India and Indo-China. In addition, there is one Malayan species, *S. thoracicus*, ranging only as far as Java and Borneo; one Palæarctic species, found throughout the entire breadth of Europe and Asia, from Belgium to Eastern China; one inhabits Mauritius, and one Mexico. The African *S. goryi* Har. and the Indian *S. hirtus* Wied. are the dominant forms in their respective regions. These two species are closely related, and probably at a not very remote date formed a single species ranging across two continents, like *S. schaefferi* to-day. It is very interesting to find that the only known American species, *S. mexicanus*, is not, as might have been expected, an isolated form, but is closely related to *S. goryi* and *hirtus*.

Key to the Species of Sisyphus.

1 (6)	Middle femora and tibiæ toothed.	
2 (3)	Flattened lateral area of pronotum not sharply defined	*tarantula* Arr., p. 69.
3 (2)	Flattened lateral area of pronotum *sharply defined.*	
4 (5)	Metasternum strongly punctured in front	*mendicus* sp. n., p. 70.
5 (4)	Metasternum feebly punctured in front	*araneolus* Arr., p. 71.
6 (1)	*Middle femora and tibiæ not toothed.*	
7 (12)	Basal half of the hind femur forming a slender footstalk.	
8 (9)	Hind femur gradually dilated	*longipes* Oliv., p. 71.
9 (8)	Hind femur abruptly dilated.	
10 (11)	Pronotum with very *shallow punctures*	*neglectus* Gory, p. 73.
11 (10)	Pronotum with very deep punctures.	*denticrus* Fairm., p. 74.
12 (7)	Hind femur short-stalked.	
13 (14)	Pronotum closely punctured, with median raised line	*indicus* Hope, p. 75.
14 (13)	Pronotum not closely punctured, without median raised line	*hirtus* Wied., p. 76.

29. **Sisyphus tarantula.** (Plate III, fig. 10.)

Sisyphus tarantula Arrow, Ann. Mag. Nat. Hist. (8) iv, 1909, p. 92.

Black, with the head and pronotum feebly coppery, smooth but not very shining above, and clothed, not very closely, with dark hooked setæ.

Oval, very convex, with very long posterior legs, the front tibia armed with three sharp teeth, occupying less than half the outer edge, and the basal part rather obsoletely serrate. The *head* is strongly and fairly closely punctured, the *clypeus* bearing at the front margin two small acute teeth, placed rather far apart and separated by a curvilinear excision. The *pronotum* is finely and very sparsely punctured, a little more numerously in front, and there is a fine median groove upon the posterior half. The front angles are acute, the outer margins obtusely angulate near the middle and the flattened lateral area on each side strongly and sparsely punctured, but not sharply defined. The *elytra* are scarcely as long as their combined width, and bear shallow punctured striæ. The *pygidium* is shining and strongly but not very closely punctured. The *metasternum* is very sparsely and irregularly punctured, with a slight depression at its base.

♂. The front tibia has a strong tubercle beneath, at the base of the tarsus. The middle femur is a little flattened and dilated, and has a very blunt tooth before the end of its posterior edge; and the middle tibia has a corresponding strong hooked tooth behind the base of its inner edge. The trochanter

of the hind leg is produced into a very strong backwardly directed tooth, the hind femur has a strong triangular lobe behind, of which the apex is thickened and feebly bicuspid, and the hind tibia is strongly curved.

♀. Unknown.

Length, 11 mm.; breadth, 6·5 mm.

CEYLON: Balangoda, 3500 ft. (*G. Lewis*, April).

Type in the British Museum.

Found in dense jungle.

I have seen only two male specimens.

30. **Sisyphus mendicus**, sp. n.

Black, with a slight coppery lustre and very feebly shining, the antennæ and a clothing of fine hooked setæ reddish-yellow.

Oval and moderately convex. The front tibia has three sharp external teeth occupying less than half the outer margin. The middle femur bears a blunt tooth a little beyond the middle of its lower edge, and the tibia has a strong lobe in the middle of its inner edge, and is very slender and strongly curved in front of it. The hind trochanter is slightly prominent at the extremity, the femur has two broad lobes near the middle of the lower edge, and the tibia is moderately broad and strongly bent before the middle. The *head* is closely and coarsely punctured and the front margin of the *clypeus* is bluntly bidentate, the sides rounded and not dentate. The *pronotum* bears fairly close and large annular punctures, with a sharply defined flattened lateral area, which bears only a few large punctures. The *elytra* are shallowly striate, the striæ formed of chains of rather close large punctures. The *pygidium* bears large and rather close shallow punctures. The *mesosternum* is coarsely and fairly closely punctured, and the *metasternum* has a large, oval, irregularly punctured depression upon its posterior half, and is strongly and fairly closely punctured in front and on each side of it.

Length, 7·5 mm.; breadth, 4 mm.

MADRAS: Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May).

Type in the British Museum.

The type is unique. It is almost certainly a male.

This species resembles *S. tarantula*, but is smaller, and has a rather longer and less globular body, the prothorax in particular being less convex, the upper and lower surfaces are much more strongly punctured, and the legs not so long, with the hind trochanters only very slightly produced.

From *S. araneolus* it differs, in addition to the lobed hind femora and strongly bent hind tibiæ, in the strongly punctured meso- and metasternum.

31. **Sisyphus araneolus.**

Sisyphus araneolus Arrow, Ann. Mag. Nat. Hist. (9) xix, 1927, p. 464.

Reddish, opaque above and shining beneath, and clothed, not very closely, with minute, hooked, yellowish setæ.

Oval, convex, with very slender posterior legs; the front tibia armed with three sharp teeth, occupying less than half the outer edge, the upper part finely serrate; the basal half of the hind femur forming a slender footstalk, the hind trochanter produced into a short acute spine at the tip. The *head* is strongly and closely punctured, the front margin bearing two small acute teeth, placed rather far apart and separated by a curvilinear excision. The *pronotum* is transverse, and bears large, not close, annular punctures, and there is a fine median groove upon the posterior part. The front angles are acute, the lateral margins sharply angulate before the middle, and the posterior lateral flattened area is very sharply defined and sparsely punctured. The *elytra* are slightly longer than their combined width and bear very shallow, coarsely punctured striæ. The *mesosternum* is closely punctured, and the *metasternum* has a roundish posterior depression and is coarsely and rather closely punctured at the sides and in the depression.

♂. The front tibia has a tubercle beneath at the base of the tarsus; the middle femur has a strong tooth before the end of the lower edge, and the middle tibia has a slight corresponding dilatation; the trochanter of the hind leg is sharply spinose at the extremity, and the hind femur has a minute acute tooth at the lower edge before the extremity.

Length, 5·5 mm.; breadth, 3·5 mm.

S. India: Nilgiri Hills, Gudalur (*E. E. Green*, May).

Type in the British Museum.

The only two known specimens appear to be both males.

32. **Sisyphus longipes.**

Scarabæus longipes Oliv.,* Entom. i, 3, 1789, p. 164, pl. xix, fig. 177; Arrow, Ann. Mag. Nat. Hist. (9) xix, 1927, p. 457.
Scarabæus minutus F.,* Ent. Syst. i, 1792, p. 70.
Copris helwigi F.,* Ent. Syst., Suppl. 1798, p. 35.

Black and shining above and beneath, with a very minute and inconspicuous clothing of erect reddish setæ, fairly close upon the pronotum, but leaving a small bare patch upon each side of the anterior part, and very scanty upon the head, elytra, and lower surface.

Broadly oval, highly convex, with extremely long and slender posterior legs; the front tibiæ armed with three teeth occupying less than half the outer edge, very finely serrate above the teeth, the two terminal teeth very close at the base; the middle and hind femora with very slender basal part and

strongly swollen terminal part, the swollen part of the hind femur confined to the outer half, the hind trochanters prominent at the end. The *head* is moderately strongly punctured, the *clypeus* almost semicircularly emarginate in front and produced into two sharp teeth, not very widely separated, with a short but rather sharp oblique ridge on each side at the junction of clypeus and ocular lobe. The *pronotum* is finely punctured, moderately closely in front, scantily behind, with a fine posterior longitudinal groove, the front angles are acute and the lateral margins strongly angulate before the middle, the posterior lateral flattening very sharply defined. The *elytra* are not longer than their conjoint width, strongly narrowed behind and finely striate, with the intervals

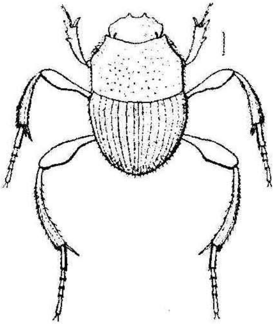

Fig. 4.—*Sisyphus longipes.*

flat. The *pygidium* is narrow and rather closely covered with large, shallow, roundish pits. The *metasternum* is divided by a curved line from the *mesosternum*, and finely, sparsely, and rather evenly punctured, with a large round depression behind, and almost destitute of setæ. The distance from the middle to the hind coxa is equal to half the length of the middle coxa.

The two sexes are alike externally.

Length, 4–6·5 mm. ; breadth, 2·5–4 mm.

Burma : Mandalay (*L. Fea*, Dec.) ; Palon (*L. Fea*, Aug., Sept.) ; Asciuii Ghecu, Karen Hills, 4200–4500 ft. (*L. Fea*, March, April). Bengal : Maidan, Calcutta (*F. H. Gravely*, May). Orissa : Barkul (*F. H. Gravely*, Aug.).

CENTRAL PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, March–May); Koka Bhandam (*E. A. D'Abreu*, Oct.); Sagoda, Purna River, Buldana Dist. (*N. C. Chatterjee*, Feb.). MADRAS: Barkuda Is., Chilka Lake, Ganjam Dist. (*N. Annandale*, Feb.); Ootacamund, Nilgiri Hills; Samalkot (June, July). BOMBAY: Belgaum (*H. E. Andrewes*). CEYLON: Horawupotana (*G. M. Henry*, Oct.); Wirawila, S. Prov. (July); Niroddumunai (May).

Type of *longipes* Oliv. and *minutus* F. in the Hope Dept., Oxford Museum; that of *helwigi* F. in the Copenhagen Museum.

The late Dr. Annandale found a specimen in the nest of an ant, *Pheidole rhombinoda*, beneath a stone.

S. longipes differs from most other species of the genus in its smooth, shining upper surface, and, unlike most of its congeners, is not usually found in a dirty condition. Many specimens have a white encrusting material forming a more or less symmetrical but not constant pattern at the sides of the thorax, elytra, and abdomen.

33. **Sisyphus neglectus.**

Sisyphus neglectus Gory, Mon. Sisyphus, 1833, p. 14; Arrow, Ann. Mus. Nat. Hist. (9) xix, 1927, p. 460.

Black and opaque, except the legs and metasternum, which are shining, and fairly closely clothed above with minute brown, erect, hooked setæ.

Oval, highly convex, with very long and slender posterior legs, the front tibia armed with three sharp teeth occupying rather less than half its outer edge, the upper half finely serrate; the four posterior femora very slender at the base, the basal half of the hind femur forming a long footstalk, the hind trochanter bearing a sharp tooth in the middle of its posterior edge. The *head* and *pronotum* are moderately closely punctured, the latter with rather a deep posterior median groove. The front margin of the *clypeus* has two fairly widely separated teeth, divided by a curvilinear excision, and the outer teeth are blunt and feeble. The *pronotum* is a little wider than it is long, with the front angles acute, the lateral margins strongly but not acutely angulate before the middle, and the posterior lateral flattened area very sharply defined. The *elytra* are not longer than their conjoint width, and have well-marked punctured striæ and flat intervals. The *metasternum* is coarsely punctured and has a slight rounded depression posteriorly, and the *mesosternum* is rugosely punctured.

♂. The hind femur has a minute sharp tooth just beyond the middle of its posterior edge, directed backward towards the base.

♀. The hind femur has a very feeble angulation at its posterior margin, but is not toothed.

Length, 5·5–7 mm.; breadth, 3·5–4 mm.

PUNJAB: Murree, 5500 ft. (*B. M. Bhatia*, June). BOMBAY: N. Kanara (*T. R. D. Bell*); Gogo, Kathiawar Peninsula; Dharwar (*H. Swale*, Oct.–Jan.). CENTRAL PROV.: Chikalda (*N. B. Kinnear*, Dec.). U. PROV.: Dhobi Ghat, Mussoorie (*M. Bosc*, April). S. MYSORE (*H. L. Andrewes*).

This is closely related to *S. denticrus* Fairm. That species has a similar backwardly directed tooth upon the hind femur of the male, but *S. neglectus* is more closely covered with setæ, the pronotum is less deeply and closely punctured, and the hind femur of the male is more slender at the base.

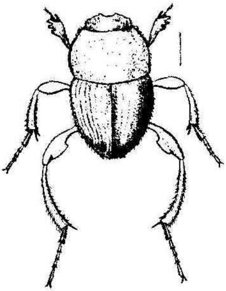

Fig. 5.—*Sisyphus neglectus*, ♂.

The type of *neglectus* is said to be a specimen from Gogo given by Hope to Gory. The Gory Collection of *Sisyphus* seems to have ultimately found its way into the Hope Collection at Oxford, which contains two specimens from Gogo named *neglectus* by Hope, although the actual one retained by Gory is not to be found.

34. Sisyphus denticrus.

Sisyphus denticrus Fairm., Ann. Soc. Ent. France, (6) vii, 1886, p. 320.

Black, with the head, legs, and lower surface shining and more or less metallic, the pronotum feebly shining, and the elytra satiny, the upper surface fairly closely clothed with minute brown, erect, hooked setæ.

Oval, highly convex, with very long and slender posterior

legs, the front tibia armed with three sharp teeth occupying rather less than half the outer edge, the upper half finely serrate, the four posterior femora very slender at the base, and the basal part (nearly half) of the hind femur forming a long footstalk, the hind trochanter sharply toothed in the middle of its posterior edge. The *head* and *pronotum* are closely and strongly annularly punctured, the latter having a faint median posterior groove. The front margin of the *clypeus* bears two rather widely separated teeth, divided by a curvilinear excision, and the outer teeth are blunt and feeble. The *pronotum* is a little wider than it is long, with the front angles acute, the lateral margin strongly but not acutely angulate before the middle, and the lateral flattened area very sharply defined. The *elytra* are not longer than their combined width, and have strongly marked striæ with flat intervals. The *mesosternum* and *metasternum* are coarsely and closely punctured, and the latter has a large roundish impression reaching from the front to the hind margin.

♂. The hind femur has a minute sharp tooth just beyond the middle of its posterior edge, directed backward towards the base.

Length, 6·5–7·5 mm. : breadth, 4–4·5 mm.

ASSAM : Manipur (*W. Doherty*). SIKKIM : Pashok, Darjeeling Dist., 2000 ft. (*F. H. Gravely*, June). BURMA : Toungoo (*L. Fea*, May) : Cheba, 1200–2700 ft., Asciuii Ghecu, 4200–4500 ft.. Karen Hills (*L. Fea, March, April*) : Paukkaung, Kachin Hills, 1000 ft. (*F. Kingdon Ward*, April). YUNNAN. S.W. CHINA.

Type in the Paris Museum.

M. Lesne, of the Paris Museum, has kindly examined the type for me. It differs only very slightly from *S. neglectus*, but may be distinguished by the very deep annular punctures of the pronotum.

35. Sisyphus indicus.

Sisyphus indicus Hope,* Gray's Zool. Misc. 1831, p. 22.
Sisyphus kaschmirensis Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 516.

Black, rather opaque, exeept upon the legs and metasternum, which are shining and fairly closely clothed with brown, erect, hooked setæ.

Oval, slightly elongate, highly convex, with very long and slender legs, the front tibia armed with three strong teeth occupying not quite half the outer edge, the upper half serrate; the hind femur tapering at each end, the basal part forming a slender but not very long footstalk, the hind trochanters not freely produced. The *head* is moderately, and the *pronotum* rather closely, punctured with round shallow

punctures, the pronotum with a rather faint median longitudinal raised line anteriorly. The front margin of the *clypeus* has two widely separated teeth, divided by a curvilinear excision, and the outer teeth are blunt and feeble. The *pronotum* is a little wider than it is long, with the front angles acute, the lateral margins strongly but not acutely angulate before the middle, and the lateral flattened area very sharply defined. The *elytra* are scarcely longer than their conjoint width, strongly narrowed to the extremities, with shallow striæ and nearly flat intervals. The *metasternum* has a large round posterior depression, smooth, shining, and very scantily punctured, and its anterior angles contain very large punctures and a few scattered setæ.

♂. The hind femur has a narrow, blunt, slightly oblique process in the middle of its hind margin.

♀. The hind femur has a slight broadly rounded projection in the middle of its hind margin.

Length, 8–10 mm. : breadth, 5–6 mm.

KASHMIR : Batote, Udhampur Div., 5500 ft. (*B. M. Bhatia*, May). NEPAL (*Maj.-Gen. Hardwicke*). SIKKIM : Pashok, Darjeeling Dist., 2000 ft. (*F. H. Gravely*, May, June). PUNJAB : Phagu, 7600 ft. (*S. W. Kemp*, Oct.), Theog, 7600 ft., Matiana, 7900 ft., Simla Hill States (*S. N. Chatterjee*, Sept.). ORISSA : Barkul (*F. H. Gravely*, Aug.). ASSAM : Sylhet ; Khasi Hills ; Naga Hills (*W. Doherty*).

Type in the British Museum ; that of *kaschmirensis* in the Vienna Museum.

This species has a close resemblance to the more abundant *S. hirtus*, whose range is more to the south. The male is easily distinguishable by the narrow process upon the hind femur, which replaces the inconspicuous projecting keel in the same position in the male *S. hirtus*. The female, in spite of the rounded prominence in the same part, is sometimes not easily distinguished. There is a light median line upon the pronotum, absent in *S. hirtus*, and the three teeth of the front tibia are a little closer together.

36. Sisyphus hirtus.

Sisyphus hirtus Wied.,* Zool. Mag. ii, 1, 1823, p. 24.
Sisyphus setosulus Walk.,* Ann. Nat. Hist. (3) ii, 1858, p. 208.
Var. *subsidens* Walk.,* l. c.

Black, opaque, except upon the legs and metasternum, and fairly closely clothed with brown, erect, hooked setæ.

Oval and highly convex, with very long and slender legs, the front tibia armed with three strong teeth, occupying half the outer edge, the upper half serrate, the hind femur tapering at each end and the basal part forming a slender but not very long footstalk, the hind trochanters not freely produced. The *head* and *pronotum* are moderately strongly

and closely punctured with round shallow punctures, and the front margin of the *clypeus* has two widely separated inner teeth, the outer teeth blunt and feeble. The *pronotum* is only a little wider than it is long, the front angles are acute, the lateral margins strongly but not acutely angulate before the middle, and the lateral flattened area is very sharply defined. The *elytra* are a little longer than their combined width, very strongly narrowed to the tips, with shallow striæ and slightly convex intervals. The *metasternum* bears very large punctures and a few scattered setæ in its anterior

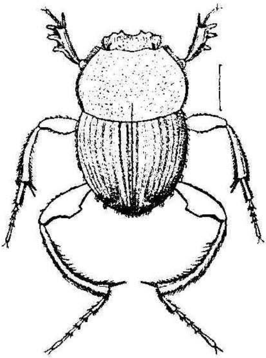

Fig. 6.—Sisyphus hirtus, ♂.

angles, and the posterior part has a large round depression, smooth and shining and almost devoid of punctures.

♂. The hind femur has a very slight rectangular projection near the middle of its hinder edge.

Length, 6–9·5 mm. ; breadth, 4–6 mm.

BENGAL : Berhampore (*E. T. Atkinson*). BOMBAY : Belgaum (*H. E. Andrewes*). S. INDIA : Sappal, Palghat, 1700 ft. (*J. C. M. Gardner*, May) ; Bangalore ; S. Mysore (*H. L. Andrewes*) ; Nilgiri Hills (*H. L. Andrewes*) ; Karkur Ghat, Malabar. CEYLON : Kandy (*G. E. Bryant*, June) ; Kitulgala, 1700 ft. (*G. Lewis*, Jan.) ; Wirawila, S. Prov. (*G. M. Henry*, July) ; Horawupotana (*G. M. Henry*, Oct.) ; Bintenne (*G. M. Henry*, Oct.).

Type in the Hamburg Museum ; those of Walker in the British Museum.

Var. **subsidens** Walk.

This name was given by Walker to certain small specimens from Ceylon which appear to represent a variety of the species. Similar specimens are found in Southern India, and the two forms occur in the same places. The small examples usually have the depression upon the metasternum more punctured than that of typical specimens and the hind trochanters more distinctly toothed, but these features are not very constant, and seem to have no specific value.

S. INDIA : Bangalore : S. Mysore (*H. L. Andrewes*) ; Nilgiri Hills (*H. L. Andrewes*) ; Calicut ; Trivandrum. CEYLON : Mt. Lavinia (*G. E. Bryant*) ; Bintenne (*G. M. Henry*, Oct.).

Sisyphus hirtus is a very common Indian insect, which has the closest resemblance to an equally common African species, *S. goryi* Har., from which a close examination is needed to distinguish it. The easiest way of separating the two forms is by an examination of the metasternum. That of *S. goryi* is very strongly punctured, and that of *S. hirtus* only very scantily. The hooked setæ, with which both are clothed, are rather finer in the Indian species, and the angulation of the margins of the prothorax is less sharp. The slight keel at the posterior edge of the hind femur also distinguishes the male of *S. hirtus*. The African species ranges over the greater part of the continent, from the Cape Province to Sierra Leone and Somaliland, and we may reasonably conclude that at no very remote period a single species ranged through both continents. The encroaching desert has no doubt divided it into two separate communities which, by isolation, have acquired slight distinctive features. It is remarkable that the only species of *Sisyphus* found in the Western Hemisphere, *S. mexicanus* Har., is also extremely closely related to the two Old World forms mentioned, although it is rather narrower in shape. Its occurrence in Mexico is very surprising.

The smooth, scarcely punctured metasternum of *S. hirtus* serves to distinguish it from the American species also.

Division III. COPRINI.

The form varies considerably ; the legs are not very slender, the middle coxæ are far apart and more or less parallel. The middle and hind tibiæ dilate towards the extremity, the middle pair have each two terminal spurs, and the hind pair one each. The middle and hind tarsi are more or less flattened, and the first four joints successively diminish in length and breadth, the basal joint being much longer than the next.

This group contains by far the greater number of the species of Coprinæ, including all those bearing horns upon head and thorax.

Key to the Genera of Coprini.

1	(2)	Pronotum with two lateral carinæ..	Synapsis Bates, p. 80.
2	(1)	*Pronotum with one lateral carina.*	
3	(30)	Pronotum without two basal impressions near the middle.	
4	(25)	Scutellum wanting.	
5	(20)	Middle and hind tibiæ dilated at the end.	
6	(9)	Elytra with two lateral carinæ.	
7	(8)	First joint of the antennal club shining	Heliocopris Burm., [p. 84.
8	(7)	*Antennal club entirely pubescent* ..	Catharsius Hope, p. 92.
9	(6)	Elytra with one lateral carina.	
10	(11)	*Pronotum with a strong basal groove*......................	Copris Fourcr., p. 102.
11	(10)	Pronotum without a strong basal groove.	
12	(13)	Four posterior tarsi broadly dilated.	Phalops Er., p. 134.
13	(12)	Four posterior tarsi not broadly dilated.	
14	(15)	Elytral epipleuræ wide and sharply reflexed......................	Anoctus Shp., p. 138.
15	(14)	*Elytral epipleuræ not wide and sharply reflexed.*	
16	(17)	Wingless; elytra very much narrowed at the shoulders	Disphysema Har., p. 140.
17	(16)	Winged; elytra not very much narrowed at the shoulders.	
18	(19)	Terminal margin of the front tibia at right angles to the inner margin and anterior angles of the prothorax hollowed beneath	*Caccobius Thoms.*, [p. 141.
19	(18)	These characters not both, and usually neither, present	Onthophagus Latr., [p. 159.
20	(5)	Middle and hind tibiæ slender, not dilated at the end.	
21	(22)	Rather depressed; lateral margins of the elytra very sharp	Phacosoma Bouc., [p. 354.
22	(21)	Very convex; lateral margins of the elytra not very sharp.	
23	(24)	Clypeus *bidentate*	*Parachorius* Har., [p. 357.
24	(23)	Clypeus quadridentate	Cassolus Shp., p. 360.
25	(4)	Scutellum present.	
26	(27)	Elytra not fringed before the hind margin	Liatongus Reitt., p. 362.
27	(26)	Elytra fringed before the hind margin.	
28	(29)	Sides of the abdomen exposed above.	Oniticellus Serv., [p. 375.
29	(28)	Sides of the abdomen not exposed above	Drepanocerus Kirby, [p. 380.
30	(3)	Pronotum with two basal impressions near the middle.	
31	(32)	Scutellum very minute; front tarsi absent in both sexes...........	Onitis F., p. 386.
32	(31)	Scutellum not very minute; front tarsi present in the female	Chironitis Lansb., [p. 401.

Genus SYNAPSIS.

Synapsis Bates, Col. Hefte, iv, 1868, p. 89.
Homalocopris Solsky, Hor. Ent. Soc. Ross. viii, 1871, p. 136; Sharp, C. R. Ent. Soc. Belg. xxv, 1881, p. 92 (new syn.).

TYPE, *Copris brahminus* Hope.

Range. The Indo-Malayan Region.

Of rather depressed oval form, with fairly long but not very slender legs, the middle coxæ widely separated and parallel. Head broad, the ocular lobes completely fused with the clypeus, which is acutely notched in the middle, the outer angles strongly produced in front of the eyes, the forehead usually bearing a median tubercle. Prothorax short, with a supplementary lateral carina on each side, uniting in front and behind with the outer marginal carina, and enclosing a lenticular space. Outer margin bearing two or three sharp teeth anteriorly, the hind angle obsolete. Scutellum absent. Elytra with rather straight sides, sharp lateral carina, broad epipleuræ, and six dorsal striæ. Front tibia armed with three strong teeth, the terminal one long and blunt; tarsus rather short and stout. Middle and hind tibiæ slender at the base, dilating gradually to the extremity, which is digitate; tarsi with diminishing triangular joints, moderately long and not very broad. Metasternum long, the hinder part a little produced in the middle, with a rather deep posterior depression, the sides divided transversely by a raised and rather irregularly curved line, extending from the end of the middle coxal cavity to the outer margin. Antenna short, 9-jointed, the 4th joint a little longer than the 3rd, the 5th and 6th very short, the last three entirely pubescent. Mandible narrow, with rather short fringe. Maxilla narrow, with slender palpus, the 4th joint three times as long as the 3rd. Mentum scarcely bilobed, the labial palpi rather far apart, with the basal joint large but elongate, the 2nd small, the 3rd slender but nearly as long as the 2nd.

This is a peculiar and interesting genus, which seems to form a connecting link between the slender-legged ball-rolling genera and *Copris* and *Heliocopris*, the habits of which two latter genera *Synapsis* seems to share. The close fringe of hairs upon the hind legs of the male is a feature shared with *Scarabæus*, and the inner marginal carina upon the pronotum occurs in a still more developed condition in *Sisyphus*. A remarkable characteristic of some of the species is the interlocking of the head and thorax, no doubt increasing their efficiency for excavating and removing the earth from the burrow. The outer angle of the head is produced into a long sharp-pointed process, the hinder margin of which follows the outline of the thorax, while the tip fits into a deep recess provided for it in the thoracic margin.

The largest known species of the genus, *S. tmolus* Fisch., has been treated as constituting a distinct genus, *Homalocopris*, but it differs from the rest less than some of these differ from each other. Unless several more genera are formed, for which there is no necessity at present, all are best kept together.

The nidification of *S. tmolus* has been studied by M. Sijazov, and is referred to in the Introduction to this volume.

Key to the Species of Synapsis.

1 (4) Lateral angles of the head produced into very slender acuminate processes.	
2 (3) Inner front angle of the prothorax sharp.	*tridens* Sharp, p. 81.
3 (2) Inner front angle of the prothorax rounded	*brahminus* Hope, p. 82.
4 (1) Lateral angles of the head not slenderly produced.	
5 (6) Sides of the elytra strongly rounded; front angles of prothorax hollowed and hairy beneath	*birmanicus* Gill., p. 83.
6 (5) Sides of the elytra nearly straight; mesosternal epimera hollowed and hairy	*gilleti*, sp. n., p. 83.

37. **Synapsis tridens.** (Plate VII, fig. 8.)

Synapsis tridens Sharp,* C. R. Soc. Ent. Belg. xxv, 1881, p. 92.

Black and not very shining, with a scanty clothing of reddish hairs upon the legs and lower surface.

Oval and not very convex. The *head* is rugose in front and granular behind, short and very broad, with the *clypeus* deeply notched in the middle and bluntly bilobed, and the ocular lobes produced into long, curved, and sharply pointed processes. There is a rather short sharp tubercle in the middle of the forehead. The *pronotum* is rather tumid in its posterior half, which is smooth and shining in the middle and has a longitudinal median groove. The anterior half, the sides, and a narrow basal band are closely granular, and there is a slight blunt prominence a little behind the middle of the front margin. The lateral margin is rounded, the front angle sharply toothed, with two other sharp teeth adjoining it, the hind angle entirely obsolete, and the base rounded. The *elytra* are very lightly striate, the intervals almost flat and rather opaque. The *pygidium* is feebly rugulose. The *metasternum* is smooth in the middle, lightly granular at the sides, and rather deeply excavated behind. The middle and hind tibiæ are gently curved and moderately broad at the extremity, and the hind femur has a sharp tooth at the hind margin not far from the base.

♂. The hind tibia bears a long and close fringe of red hairs extending nearly its entire length. The hind femur has sometimes a slight prominence upon its lower face near the middle.

Length, 28–34 mm. : breadth, 17–21 mm.

BENGAL : Berhampore (*E. T. Atkinson*). ASSAM : Manipur (*W. Doherty*). BURMA : Ghecu, Karen Hills, 3900–4200 ft. (*L. Fea*, Mar.).

Type in M. René Oberthür's collection.

The type is a male without a supplementary prominence upon the hind femur.

38. **Synapsis brahminus** Hope. (Plate VII, fig. 9.)

Copris brahminus Hope,* Gray's Zool. Misc. 1831. p. 22 ; Bates, Col. Hefte, iv, 1868, p. 89 ; Sharp, *op. cit.* xiii, 1875, p. 45.
Synapsis batesi Sharp,* Col. Hefte, xiii, 1875, p. 43 (new syn.).

Black, not very shining, with the antennæ and mouth-organs reddish, and the lower surface and legs clothed with reddish hair.

Oval and not very convex. The *head* is rugose in front and granular behind, short and very broad, the *clypeus* deeply notched in the middle and bluntly bilobed, the ocular lobes produced into very long, curved, and sharp-pointed processes. There is a blunt tubercle in the middle of the forehead. The *pronotum* is moderately and rather evenly convex, covered with fine and close granules, except in the middle of the basal part, which bears a few fine punctures and a faint longitudinal groove. The lateral margin is sharply bidentate anteriorly, but the internal angle is rounded. The hind angles are very obtuse and the base is well rounded. The *elytra* are fairly strongly striate, the intervals slightly convex and lightly coriaceous. The *pygidium* bears fine scattered granules at the sides. The *metasternum* is smooth, with lightly rugose sides and deep posterior excavation. The middle and hind tibiæ are very gently curved and not very broad at the extremity, and the hind femur bears a minute posterior tooth not far from the base.

♂. The hind tibia bears a long and very close fringe of reddish-golden hairs along its entire length.

Length, 28–30 mm. ; breadth, 17–18 mm.

NEPAL (*Maj.-Gen. Hardwicke*). BHOTAN. SIKKIM : Mangpu (*E. T. Atkinson*).

Type in the British Museum ; that of *batesi* in M. René Oberthür's collection.

The single specimen described as *batesi* by Sharp is a small and rather badly worn example, and the differences mentioned by him are due to this.

39. **Synapsis birmanicus.** (Plate VII, fig. 7.)

Synapsis birmanicus Gill.,* Ann. Mus. Civ. Genova, 1907, p. 600.

Black, very smooth, but not very shining, with scanty reddish hairs upon the legs and lower surface and a thick pad of short velvety red hair beneath the front angles of the prothorax.

Rather narrowly oval and feebly convex. The *head* is rugose, with the *clypeus* cleft and bilobed in front, the ocular lobes moderately sharply angular laterally but not produced and the forehead without a median tubercle. The *pronotum* is smooth, with the sides coriaceous or finely rugose. The front angle is toothed, and the sides bear an obtuse angulation close to the tooth and are gently rounded from there to the base, which also is gently rounded and the hind angle almost obsolete. The *elytra* are well rounded at the sides and extremely finely striate, with minute punctures in the striæ, the intervals quite flat and very finely coriaceous. The *pygidium* is finely and not very closely granular. The *metasternum* is finely and fairly evenly and closely punctured, asperately at the sides, with a deep median impression near its posterior border. The middle tibia is short and nearly straight, with very strong external teeth, and the hind tibia is rather slender and scarcely curved. The hind femur bears a slight tooth before the middle of its lower edge.

Length, 25 mm.; breadth, 14·5 mm.

BURMA: Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.).

Type in the British Museum.

I have seen only the unique type-specimen.

40. **Synapsis gilleti,** sp. n. (Plate VII, fig. 10.)

Black, not shining, with the antennæ, mouth-organs, and a scanty clothing of hairs upon the lower surface and legs dark red.

Rather elongate, subopaque above, not very convex, with the mesosternal epimera hollowed and the hollows marked by long and close reddish hairs, springing from the margins and directed to the centre. The *head* is rugosely punctured, the front margin of the *clypeus* is cleft in the middle and slightly produced on each side, the forehead slightly tumid in the middle, the lateral angles of the head only a little produced and bluntly angular. The *pronotum* is minutely and inconspicuously punctured, the punctures few in the middle, close round the margins and rather larger at the sides. The front angle is distinct but not produced nor acute, and there is a very obtuse angulation just behind it, the sides are strongly rounded, the hind angles obsolete, and the base gently rounded. The

elytra are extremely finely striate, the intervals almost flat and opaque, and the lateral margins almost straight and parallel, except in front and behind. The *pygidium* is finely transversely rugose and opaque. The metasternal shield is smooth in front and shallowly and unevenly punctured behind, where there is a deep longitudinal impression, and the sides of the *metasternum* are finely and not closely asperate. The *front angles of the prothorax are scarcely hollowed and not* hairy beneath, but the mesosternal epimera are hollowed and the hollows are masked by close fringes of long reddish hairs, arising from the margins and directed to the centre. The hind femora bear a very small tooth at the posterior margin a little before the middle, and the middle and hind tibiæ are very feebly curved and a little dilated at the end.

Length, 24 mm. ; breadth, 14 mm.

BENGAL : Darjeeling District, 1500 ft.

Type in the British Museum.

Dr. Gillet has a specimen of this species from an unknown locality.

The peculiar hollows in the mesosternal epimera, masked by long hairs directed inwards from the margin, show this to be related to *S. ovalis* Boue., the only other known species possessing them, but it is of narrower shape and less shining than that insect, the posterior angles of the head are less produced, and the front angles of the pronotum blunt.

Genus HELIOCOPRIS.

Heliocopris Burm., Gen. Ins. x, 1846, Col. no. 27, figs. 1–8 ; Lacord., Gen. Col. iii, 1856, p. 98.

TYPE, *Copris pirmal* F. (South Africa).

Range. Africa, Arabia, India, Malay Peninsula, and Sumatra.

Large, broad, and massive. Legs not long, the front tibia armed with three external teeth, the four posterior tibiæ dilating strongly from base to extremity, toothed at the outer edge, the middle with two, the hind with one terminal spur ; all tarsi present, the posterior ones with progressively diminishing joints, triangular in shape, the basal one much longer than the 2nd. Head rather large, the ocular lobes united by a carinate suture with the clypeus, of which the margin is rounded or slightly excised in the middle. Eyes not very deeply divided, the upper part not very small, pronotum with stiff, erect, lateral fringes and complete basal groove. Scutellum wanting. Elytra with broad epipleuræ bearing a supplementary carina and seven dorsal striæ. Front

coxæ prominent. Middle coxæ long, not very widely separated, nearly parallel. Hind coxæ with stridulatory ridges at the inner end within the coxal cavities, which are microscopically striate. Abdomen completely covered, with a lateral carina continued across the pygidium. Antenna 9-jointed, the 7th joint smooth and shining on its outer face and partially enclosing the succeeding joints. Mandible narrow, with short basal and rather long terminal fringe. Maxilla long, the palpus slender, with three subequal joints, and the 4th rather longer. Mentum deeply cleft, the labial palpi very broad, the basal joint strongly transverse, the 2nd about twice as long as wide, the 3rd very minute.

One of the chief distinctive features of this genus is found in the stridulating ridges within the hind coxal cavities. The chitin at the base of the abdomen lining the cavity is very hard, and a considerable part of its inner end is microscopically striated in a transverse direction. The surface of the coxa in contact with this part is rough and hairy, but the hairs and roughness end abruptly just before the inner edge, at which the membranous attachment occurs. Here, close to the inner end of the coxa, is found a very small patch of very close and regular ridges exactly like those upon the wall of the cavity and running in the same direction, *i. e.*, transversely to the axis of the body. This small area is not quite flat, but slightly undulated, so that one or two slight prominences occur beyond the general surface. The effect of friction betweeen the opposing surfaces has been described by the late Dr. Annandale, who says (Proc. Zool. Soc. 1900, p. 862): "the male of the dung-beetle, *Heliocopris mouhotus*, a pair of which was brought to me at Biserat by an elephant mahout, squeaks like a bat when touched, but is silent when lifted from the ground. The female of this species is dumb." The dumbness of the female must have been temporary only, for both sexes of *H. dominus*, as of the other species of the genus, possess an identical apparatus.

Key to the Species of Heliocopris.

1 (4) Elytra closely sculptured, not shining.	
2 (3) Pronotum not entirely granulate: ♂, head two- or four-horned	*gigas* L., p. 86.
3 (2) Pronotum entirely granulate: ♂, head bearing a single horn	*tyrannus*, Thoms., [p. 87.
4 (1) Elytra shining, not closely sculptured.	
5 (6) Clypeus not distinctly truncate in front, rounded at the sides; ♂, head bearing a single horn	*bucephalus* F., p. 88.
6 (5) Clypeus truncate in front, angulate at the sides; ♂, head two- or four-horned	*dominus* Bates, p. 90.

41. **Heliocopris gigas.** (Plate IV, figs. 1–4.)

Scarabæus gigas L., Mus. Lud. Ulr. 1764, p. 16.
Heliocopris gigas Arrow, Trans. Ent. Soc. Lond. 1928, p. 74, pl. 5, figs. 3 & 4.
Scarabæus midas F., Syst. Ent. 1775, p. 21; Oliv., Ent. i. 3, 1789, p. 99, pl. 20, fig. 183; Latr., Mém. Mus. Hist. Nat. v, 1819, pl. 18, fig. 11.
Copris isidis Cast., Hist. Nat. ii, 1840, p. 76, pl. 4, fig. 5.
Heliocopris andersoni Bates, Col. Hefte, iv, 1868, p. 88.

Black, with the lower surface, and sometimes the elytra, deep reddish-black, and clothed with reddish hair upon the sides of the head, the sides and anterior part of the pronotum, the sides of the metasternum, the legs, and mouth-organs.

Broad and very convex, with the upper surface closely rugose and not shining. The *head* is broad and transversely strigose, the *clypeus* hollowed and its margin showing two slight prominences on each side. The *pronotum* is short and broad, with a steep anterior declivity bearing outstanding reddish hairs, the posterior part prominent in the middle. The surface is coarsely and irregularly rugose, with a smooth area on each side in the male. The *elytra* are rather more evenly and less closely rugose, with a narrow sutural border to each, smooth and finely, not closely, punctured, sloping strongly from the suture to each side, and the sutural region strongly rounded from base to apex. The *pygidium* is smooth and shining, with very sparse, fine, scattered punctures. The metasternal shield is smooth in the middle, bears long erect hairs in front and at the sides, and has, just before the base, a transverse impression containing scattered hairs. The sides of the *metasternum* are densely clothed with hair. The front tibia is armed with three strong teeth.

♂. The outer margins of the clypeus, at the point of junction with the ocular lobes, are produced upwards as a pair of long, slightly curved, nearly parallel horns, between which the clypeus is deeply hollowed. The ocular lobes are produced obliquely backwards as sharp angular processes. The dorsal part of the pronotum is produced forward in the middle as a broad, tapering, horizontal process which is truncate at its extremity, and each outer margin gives rise, just before the middle, to a horizontal process directed forward and pointed at the end.

In small males the lateral horns of the head are short, and a transverse carina, sometimes bidentate, may appear between them, or the lateral horns may disappear entirely, whilst the carina persists. The lateral angulation of the head also becomes blunted in small specimens. The dorsal horn of the thorax at the same time becomes short, and the lateral processes are reduced and may appear as a sharp angulation of the margin only, or entirely disappear.

♀. The ocular lobes of the head are blunt externally and not sharply produced, the clypeus is not deeply hollowed, and there is a sharply elevated transverse carina just before the eyes and minutely pointed at each end and in the middle. The pronotum has a slight, broadly rounded prominence in the middle of its dorsal part and a small angular one on each side, and there is a shallow triangular depression in the middle of its basal part.

Length, 30–50 mm.: breadth, 18–29 mm.

SIND: Karachi. PUNJAB: Rawalpindi (*Hodgart*, June, July: *T. H. L. Grosvenor*, Aug., Sept.): Thobba, Murree Hills (*Major Howland Roberts*). BIHAR: Chapra (*Mackenzie*). BOMBAY: Surat (Sept., Dec.). MYSORE: Bangalore (*T. H. L. Grosvenor*, Aug., Sept.). ARABIA. EGYPT. E. and S. AFRICA.

Type in the Upsala Museum; that of midas Fab. in the British Museum: and that of *andersoni* Bates in M. René Oberthür's collection.

The enormous range of distribution of this species is very remarkable. Not only is it found from far south to the extreme north-western border of India, but, by way of Arabia and Egypt, it extends into East and South Africa. While the females are practically alike in every part of this area of distribution, the various processes which render the male one of the strangest of insects assume a number of different phases the study of which is highly interesting.

As in the case of *H. dominus*, both two-horned and four-horned males of this species occur, the reduction of the lateral cephalic horns in small examples being accompanied by the appearance of an intervening carina (the counterpart of that characterising the female), of which the angles are produced into short points.

The male armature which has been described here is that of the Indian phase of the species. Specimens from East and South Africa are distinguished by slight but easily recognizable differences in that sex. The dorsal horn is rounded at the extremity instead of being truncate, the lateral horns of the thorax are truncate, not pointed, and the sharp, backwardly produced angles of the head are wanting. The females, however, exhibit no corresponding differences, and the two male phases pass one into the other by imperceptible stages, examples from Egypt and western Asia being transitional.

42. **Heliocopris tyrannus.** (Plate VI, figs. 1, 2.)

Copris tyrannus Thoms., Arch. Ent. ii, 1858, p. 49, pl. 2, fig. 1.
Heliocopris sturleri Har., Col. Hefte, xvi, 1879, p. 225.

Dull sooty black above, with dense patches of short reddish hair upon the lower surface.

Broadly oval and highly convex in shape. The *head* is slightly transverse, transversely strigose in front, and covered with coarse granules behind, the external margin of the *clypeus* having five rather feebly marked facets. The *pronotum* is divided by a very strong transverse carina, and its anterior part is rather coarsely, and the posterior part more finely, granular. The sides are strongly rounded, the front angles blunt but prominent, and the hind angles distinct but very obtuse. There is no basal depression. The *elytra* are very finely striate, with the intervals flat, minutely coriaceous and opaque, and the outer margins smooth and shining. The *pygidium* is shining, very minutely and sparsely punctured. The metasternal shield is smooth in the middle, sparsely hairy at the sides and hollowed in the middle of the basal part, and the sides of the *metasternum* are densely clothed with erect reddish hair.

♂. The head bears an erect median horn, slightly flattened from before backwards and a little truncate at the tip. The pronotum is strongly elevated and nearly flat dorsally, with the top of the declivity forming a broad, nearly straight carina in the middle, bent obliquely backwards at an obtuse angle on each side, with a smooth round excavation in front on each side.

♀. The head bears a sharp transverse carina, sharply but feebly pointed at each end. The prothoracic carina is evenly and rather strongly arcuate from side to side.

Length, 58–64 mm. ; breadth, 35–38 mm.

TENASSERIM : Taok Plateau (*Willoughby Lowe*, Jan.). MALAY PENINSULA. SUMATRA. JAVA.

Types of *tyrannus* and *sturleri* in M. René Oberthür's collection.

43 **Heliocopris bucephalus.** (Plate V, figs. 2, 3.)

Scarabæus bucephalus F., Syst. Ent. 1775, p. 24 ; Oliv., Ent. i, 3, 1789, p. 99, pl. 4, fig. 26.

Black, with the elytra and lower surface usually deep red, parts of the lower surface and legs clothed with coarse rust-red hair.

Broad and somewhat quadrate in shape, with the head and pronotum coarsely rugose, and the elytra very smooth and shining. The *head* is rather small, the *clypeus* moderately finely, and the vertex more coarsely, transversely strigose, the front margin feebly excised in the middle and the lateral margins somewhat serrate behind. The *pronotum* is very unevenly rugose or reticulate, with a slight depressed area in the middle of the basal part, and the front angles rather smooth. The sides are strongly rounded, the front angles are not very blunt, and the hind angles are feebly indicated.

The *elytra* are very lightly striate, with the intervals very minutely and sparsely punctured. The *pygidium* is unevenly, rather shallowly and indefinitely punctured. The metasternal shield is sparsely punctured and hairy at the sides, smooth in the middle and deeply impressed behind, the impression containing a few hairs anteriorly, and the sides of the *metasternum* are densely clothed with hair. The front tibia is armed with three strong teeth.

♂. *Maximum phase.*—The posterior narrowed part of the head is rather produced, so that the maximum width of the head is not much greater than its length, and a moderately slender pointed horn arises from the centre, slightly curved and nearly erect. The pronotum is vertical in front, and the upper edge of the declivity forms a sharp straight carina, rather feebly toothed at each end. From each side extends a sharp, obliquely produced, nearly horizontal process, beneath which is a deep shining excavation, with a small tooth at its outer edge. The anterior angles are very smooth and rather sharply produced.

In males of minor development the head is shorter, the horn is shorter, broader, and more or less bicuspid at the tip. The lateral prothoracic process is only traceable as an angular point, and the excavation is hardly apparent.

♀. The head is strongly transverse and bears a transverse carina, sharply dentate at each end. The pronotum bears a sharp, gently curved carina anteriorly, and its front angles are rather blunt.

Length, 39–55 mm. ; breadth, 24–30 mm.

BURMA : Moulmein ; Maymyo (*O. C. Ollenbach*, May) ; Thingannyinaung, 900 ft. (*F. H. Gravely*, Nov.) ; Namma, Myitkyina District (*B. N. Chopra*, Oct.) ; Mergui. BIHAR : Pusa (*T. Bainbrigge Fletcher*, June, July ; *G. P. Pillai*, Sept.) ; Chapra (*Mackenzie*). BENGAL : Calcutta. U. PROV. : Cawnpore (*C. S. Betton*, Aug.). CENTR. PROV. : Manoti, Mandla District (*H. S. Pruthi*, Nov.). BOMBAY : Bandra (*Dr. A. S. Jayakar*). SIAM. MALAY PENINSULA. JAVA.

According to Mr. C. C. Ghosh (Proc. 5th Ent. Meeting, Pusa, 1924, p. 403) the pupæ of this beetle, known as "shwe-po," are much esteemed as food in Burma. "About March–May it is very common in the Shan Hills to find Shan men, women and children going about digging different places in search of the pupæ, which are found inside round balls of agglutinated earth at a depth of about one to two feet. These people seem to known, as if by instinct, where these balls are present by an external examination of the surface, where usually a hole is observable. . . . I have seen up to seven balls being taken out of one place, and it is said that up to a dozen or

more may be found together." As each food-ball moulded by this large beetle for its offspring measures three inches or more in diameter, the subterranean chamber in which they are constructed must be of very considerable size to provide room for a dozen and to allow the mother to move freely round each. The quantity of excavated earth brought to the surface must form a fairly large heap, so that the instinct of the Shan people is not, perhaps, very remarkable.

44. **Heliocopris dominus.** (Plate V, fig. 1.)

Heliocopris domina Bates,* Col. Hefte, vol. iv, 1868, p. 88; Sharp, Fasc. Malay. Zool. i, 1903, p. 285.
Heliocopris mouhotus Sharp,* Ent. Mon. Mag. xv, 1878, p. 155; Fasc. Malay. Zool. i, 1903, p. 285, fig.

Black, with the elytra and lower surface frequently deep red, parts of the lower surface and legs clothed with rust-red hair.

Broad and somewhat quadrate in shape, with the head and pronotum transversely rugose, and the elytra very smooth and shining. The *head* is rather large, the *clypeus* finely transversely striate, its front margin truncate, its lateral margins not rounded but sinuate and convergent, and the vertex rugose, with nearly parallel sides. The *pronotum* is very unevenly rugose or granular, with small smooth areas in the male. The *elytra* are deeply striate, with the intervals finely and sparsely punctured. The *pygidium* is shining, finely and sparsely punctured. The *metasternum* is closely hairy, except along the middle of the central shield, and has a roughened and hairy oval depression before the hind margin. The basal ventral sternite is also roughened and clothed with long hairs. The front tibiæ are armed with three strong outer teeth.

♂. *Large two-horned phase.*—The clypeus is separated from the forehead by a sharp but little elevated carina curving slightly backwards, and a pair of erect, slightly divergent horns arise from the outer margins of the head at the extremities of the carina, each horn a little flattened from before backwards and obliquely truncate or bilobed at the summit. The posterior part of the head is long and the sides diverge very little from the eyes to the base of the horns. The front angles of the pronotum are rather sharp, and the lateral margins are produced outwards anteriorly as ear-like or hook-like processes, and are bisinuate behind these. The anterior part of the pronotum is nearly vertical, and divided from the posterior part by a carina which is produced in the middle, where it forms a sharp-pointed, horizontal, triangular horn. There are shining, nearly smooth areas on each side upon the anterior lateral processes and near the base not far from the middle.

Four-horned phase.—In certain males of rather smaller size the horns at the sides of the head are reduced. The transverse carina between them, on the other hand, is strongly elevated and produced into a sharp point on each side, so that four approximately equal and equidistant horns are formed. The head is relatively broader, and the sides diverge from the eyes to the base of the lateral horns. The thoracic horn also is shorter, as well as the lateral ear-like processes.

Minimum phase.—In very small males the lateral horns of the head disappear entirely, but the elevated carina remains, its angles sharp, but not produced into well marked horns. The head is broad and abruptly contracted behind. The thoracic horn also disappears, the transverse anterior carina being merely a little more prominent in the middle than at the sides, and the outer margins are without trace of lateral lobes.

♀. The female greatly resembles the males of smallest size, but the cephalic carina is acuminate, forming a triangular horn, at the base of which, on each side and a little behind, is a smaller elevation. The anterior angles of the thorax are slightly truncate, and the lateral margins are nearly straight in front and bisinuate behind. The dorsal carina is very slightly more prominent in the middle than at the sides, and there is a very faint longitudinal median impression from the carina to the base of the pronotum.

Length, 50–65 mm.; breadth, 31–38 mm.

BENGAL: Rangpur. ASSAM: Manipur (*W. Doherty*); Tura, Garo Hills, 1200–1500 ft. (*S. Kemp*, June, July). BURMA: Ruby Mines (*W. Doherty*). SIAM. MALAY PENINSULA.

Types of *H. dominus* Bates and *mouhotus* Sharp in the collection of M. René Oberthür.

Fig. 1 on Plate V is photographed from Bates's type of the species, *i. e.*, the four-horned phase. The normal (two-horned) phase is represented upon p. 211 of the General Introduction to the COLEOPTERA in this series, with the incorrect name *Heliocopris bucephalus*.

The name *Heliocopris dominus* was first given to the four-horned phase, the two-horned phase being described later as a distinct species by Sharp with the name *H. mouhotus*. Sharp afterwards (Fasc. Malay. Zool. 1903, i, p. 285) expressed the opinion that the two forms belonged to a single species, and that no intermediates would be found. He considered the four horns to represent the four cusps of the two-horned phase, the double cusps having become widely separated. This is not the case, for four-horned examples occur in which the outer horns are double. The inner horns correspond rather to the cephalic horn of the female, and seem to develop

in the male in proportion to the diminution of the lateral horns, and as a sort of compensation for the diminution. An exactly similar phenomenon occurs in *H. gigas*.

Genus CATHARSIUS.

Catharsius Hope, Col. Man. i, 1837, p. 21; Burm., Gen. Ins. x, 1846, Col. no. 27; Erichs., Ins. Deutschl. iii, 1848, p. 761.

TYPE, *Scarabæus molossus* L.

Range. Africa and Southern Asia.

Broad, compact, and very convex. Legs not long, the front tibia armed with three external teeth, the four posterior tibiæ dilating strongly from base to extremity, each with two transverse carinæ at the outer edge, the middle tibia with two and the hind with one terminal spur. All tarsi present, the posterior ones broad, with successively diminishing joints, the basal joint much longer than the 2nd. Head broad and semicircular, the ocular lobes separated by carinate sutures from the clypeus, the eyes not very small nor very deeply divided. Pronotum completely margined at the base. Scutellum wanting. Elytra with seven striæ and a sharp longitudinal carina replacing the 8th. Middle coxæ long, parallel, and moderately far apart. Abdomen completely covered, with a lateral carina continued across the pygidium. Antenna 9-jointed, the last three joints long and entirely pubescent. Mandible with a long basal molar and small, narrow, terminal ramus. Maxilla stout, the palpus with minute basal joint, and the terminal one a little longer than the 3rd. Mentum transversely rectangular, the labial palpi far apart, with the basal joint not very large, about as long as wide, the 2nd oviform, a little smaller, and the 3rd a little shorter, slender.

The genus *Catharsius* differs from *Copris* only in the supplementary lateral carina in the place of an 8th stria upon each elytron and the additional transverse carina at the outer edges of the middle and hind tibiæ.

Key to the Species of Catharsius.

1 (2) Pronotum with distinct hind angles... ***platypus*** **Shp., p. 93.**
2 (1) Pronotum without distinct hind angles.
3 (18) Meso-metasternal line angular; prothoracic sculpture consisting entirely of well-defined granules.
4 (11) Elytra entirely opaque.
5 (10) Metasternal shield fringed.
6 (7) Head with a small smooth area adjoining each eye .... ***molossus*** **L., p. 94.**
7 (6) Head without smooth area adjoining each eye.

8	(9)	*Pronotum with lateral prominence on each side*	*granulatus* Shp., p. 95.
9	(8)	Pronotum without lateral prominence on each side	*sagax* Quens., p. 96.
10	(5)	Metasternal shield not fringed	*javanus* Lansb., p. 96.
11	(4)	Elytra not entirely opaque.	
12	(13)	The four posterior tarsi very broad (the 2nd and 3rd joints of the middle tarsus broader than long)	*birmanensis* Lansb., p. 97.
13	(12)	The four posterior tarsi not very broad.	
14	(15)	Granules of pronotum very fine and dense..........................	*quadridentatus* F., p. 98.
15	(14)	Granules of pronotum less fine and dense.	
16	(17)	Head not very transverse; pronotum of male with four tubercles....	*capucinus* F., p. 99.
17	(16)	Head very transverse; pronotum of male with two tubercles...........	*pithecius* F., p. 100.
18	(3)	Meso-metasternal line straight: *pronotum granular at the sides only* ..	*inermis* Cast., p. 101.

45. Catharsius platypus. (Plate VIII, figs. 1, 2.)

Catharsius platypus Sharp, Col. Hefte, xiii, 1875, p. 42.

Black, shining beneath and dull above, with the antennæ, mouth-organs, and hairy clothing of the lower surface and legs reddish.

Very massive, short and broad, rather parallel-sided, with the legs, and especially the middle pair, short. The *head* is broad and semicircular, closely transversely strigose in front and closely granular behind. The *pronotum* is closely granular, about as broad in front as behind, the front angle forming broad rounded lobes, the lateral margins bisinuate, the hind angles well marked but obtuse, and the base margined, nearly straight, but slightly prominent in the middle. The *elytra* are scarcely rounded but rather elevated at the suture, and slope downwards from it on each side to the inner lateral carina, which is very sharp and prominent and rather straight, the carinæ of each side converging a little from the shoulders backwards. The elytra are finely striate, and the intervals are flat, obliquely strigose, and not shining, except at the inner and outer margins. The basal margin is entirely opaque and sooty. The *pygidium* is shining and rather finely punctured. The *metasternum* is closely punctured and hairy, but with a narrow, smooth, median groove, the sides clothed with long thick hair. The hind tarsi are rather long.

♂. The head bears a short, well elevated, erect transverse carina, with its outer angles a little prominent. The pronotum has a very steep declivity in front, the upper edge of which is straight in the middle, irregularly curved and bearing two minute teeth rather far apart on each side. There is an irregular-shaped shining area, perhaps not always present,

near each lateral margin of the anterior declivity. The spur of the hind tibia is broad and obliquely truncate at the end.

♀. The head bears a slightly elevated, flat-topped elevation, rather semicircular in shape, and rather more strongly elevated behind than in front. The pronotum has an anterior declivity, the upper edge of which has a nearly straight carina in the middle. The middle tarsus is short, broad, and flat, with the joints successively diminishing, and the hind tarsus is a little broader than that of the male.

Length, 35–46 mm.; breadth, 20–26 mm.

SIND: Karachi.

Type in M. René Oberthür's collection.

46. **Catharsius molossus.** (Plate VIII, figs. 6, 7.)

Scarabæus molossus L., Syst. Nat., ed. x. 1758, p. 347; Oliv., Ent. i. 3, 1789, p. 100, pl. 19, fig. 25.
Copris ursus F., Syst. Eleuth. i. 1801, p. 43.

Black and opaque, partially clothed with reddish hair beneath.

Broadly oval and very convex. The *head* is broad, with the front margin almost imperceptibly excised in the middle, the *clypeus* closely transversely rugulose, the ocular lobes densely and coarsely granular, and a small, smooth, shining area adjoining the inner margin of each eye. The *pronotum* is densely covered with fine round granules, except sometimes upon a small shining area upon each side in the male. The sides are rounded, the front angles broadly truncate, the hind angles almost obsolete, and the lateral scars large and deep. The *elytra* are very finely and lightly striate, with the intervals flat and microscopically coriaceous. The *pygidium* is finely punctured in the middle and finely granular at the sides. The metasternal shield is acutely angular in front, longitudinally grooved in its hinder part, finely and rather sparsely punctured, rather smooth and shining, and thinly clothed with erect hairs in front and at the sides, and the sides of the *metasternum* are very densely clothed. The front tibia bears three external teeth, the middle and hind tibiæ are broad and crenate at the hind margin, and the terminal spur of the hind tibia is truncate at the extremity.

♂. The head bears a conical median horn, broad and a little flattened behind at the base, sharp-pointed at the tip, and inclined a little forward. The pronotum has a steep declivity in front, the upper edge of which forms a sharp ridge feebly convex in the middle, with its extremities curving forward and produced into sharp, diverging and widely separated points, beneath each of which is a smooth and shining hollow.

In small males the cephalic horn is very short, the thoracic

carina scarcely produced at the extremities, the lateral hollows are absent, and the surface is uniformly tuberculate.

♀. The head bears a very short, pointed process, the base of which is transversely dilated and minutely angulate on each side. The pronotum has a short anterior declivity, the upper edge of which forms a nearly straight ridge, with its extremities not distinctly produced and without smooth lateral hollows.

Length, 23–37 mm. ; breadth, 14–22 mm.

SIKKIM : Mangpu (*E. T. Atkinson*) : Soom, Darjeeling District, 4000–5000 ft. (July). ASSAM : Shillong, Khasi Hills, 5500–6400 ft. (*S. W. Kemp*, Aug., Sept.) ; Sileuri, Cachar (*J. Wood-Mason*) ; Tura, Garo Hills, 1200–1500 ft. (*S. W. Kemp*, July, Aug.) : Mangaldai (*S. W. Kemp*, Oct.) : Jorhat (Pusa Coll., June) : Halem (*Mitchell*, Aug.). ORISSA : Gapkunda I., Lake Chilka (Aug.). BENGAL : Barrackpore, near Calcutta (*S. Ribeiro*) ; Siliguri (July) ; Sarda (*F. W. Champion*) ; Burdwan (*A. Murtaza*, March) ; Parbatipur (*C. Ghosh*, May). ANDAMAN IS. (*Capt. Wimberley*). BOMBAY : Bassein Fort (*A. Murtaza*, Oct.) ; Belgaum (*H. E. Andrewes*). U. PROV. : Malwa Tal, Naini Tal District, 3600 ft. (*B. Prashad* and *S. L. Hora*, Aug.) ; Simla, 3500–4000 ft. (*B. Chopra*, Aug., Sept.). BIHAR : Pusa (*G. Pillai*, July, Aug., Nov., Dec.) ; Chapra (*Mackenzie*). MYSORE : Bangalore (*T. H. L. Grosvenor*, Sept., Pusa Coll., June). S. MALABAR : Kinavallore (*P. S. Nathan*, June). CEYLON : Peradeniya (*E. E. Green*).

47. Catharsius granulatus.

Catharsius granulatus Sharp, Col. Hefte, xiii, 1875, p. 41 ; Lansb., Tijds. Ent. xxix, 1886, p. 6, note.

Almost identical with *C. molossus*, but without the smooth area adjoining the eye. The granulation of the central region of the pronotum is a little less close and regular, and the granules of the anterior declivity are rather larger and less dense.

♂. The size attained seems to be a little less than in *C. molossus*, but the cephalic horn and the lateral processes of the pronotum are longer than in specimens of similar size of that form.

Length, 23–32 mm. ; breadth, 14–19 mm.

SIND : Karachi. SIKKIM : Mangpu (*E. T. Atkinson*). BIHAR : Chapra (*Mackenzie*). U. PROV. : Allahabad. CEYLON : Killinochchi, N. Prov. (*E. E. Green*) ; Kandy (*G. Lewis*).

Type in M. René Oberthür's collection.

Sharp, in addition to the differences mentioned above, refers to differences in the sculpture of the metasternum and pygidium which I have not been able to discover. The form

is intermediate between *C. molossus* and *sagax*, and seems to suggest that all may really belong to a single species. I have been unable to distinguish the females of *granulatus* and *sagax*, but I have seen no intermediate between these and the commoner and more widely distributed *C. molossus*.

48. **Catharsius sagax.** (Plate VIII, fig. 3.)

Copris sagax Quens., Schonh. Syn. Ins. i, 1806, p. 43; Lansb., Tijds. Ent. xxix, 1886, p. 6, note.

Closely similar to *C. molossus* L., but of rather smaller average size, with the elytra generally a little less dull and sooty, and the head without the smooth shining area adjoining the eye on each side.

♂. Rather narrower in shape, with the cephalic horn less erect and situated farther forward upon the head, and the upper margin of the thoracic declivity straighter, its lateral angles sharp but not at all produced.

Length, 23–36 mm.; breadth, 14–20 mm.

BHUTAN (*Capt. Pemberton*). BENGAL: Calcutta (*H. S. Pruthi*, Oct.); Burdwan (Mar.). BIHAR: Pusa (*Murtaza* and *Pillai*, June, July, Aug., Sept., Oct.); Chapra (*Mackenzie*). CENTR. PROV.: Manoti, Mandla District (*H. S. Pruthi*, Nov.). PUNJAB: Lyallpur (July). BOMBAY: Bassein Fort (Oct.). CENTR. INDIA: Gwalior. SOUTHERN INDIA: Nilgiri Hills (*G. F. Hampson*); Shembaganur, Palni Hills, 6000 feet (*S. Kemp*); Mathimudanagudem, Kistna District (*R. Luggan*, July); Peermade, Travancore (*R. S. Imray*); Trichinopoly (*L. V. Newton*, Sept.).

The conjunction of several distinctive features seems to indicate that this is specifically different from *C. molossus*, although I know of only one character which can be relied upon to distinguish the females, viz., the absence in *sagax* of a smooth area adjoining the eye, but the metasternum appears to be usually less strongly grooved in this sex. Although found in the same places as *C. molossus* it seems to be more localized, not sharing the wide distribution of the commoner form. A series of seven specimens taken at Mathimudanagudem all belong to *C. sagax*.

49. **Catharsius javanus.**

Catharsius javanus Lansb., Tijds. Ent. xxix, 1886, p. 7.

Black, shining beneath, and entirely opaque above, except in the anterior part of the pronotum of the male, with the antennæ, mouth-organs, and a scanty clothing of hair beneath reddish.

Broadly oval and convex. The *head* is broad and finely and densely transversely rugose, with the front margin evenly

rounded and entire, and the lateral angles sharp. The *pronotum* is finely and densely granular (except in front in the male), the lateral margins are evenly rounded, the front angles squarely truncate, the hind angles obsolete, and the base gently rounded and finely margined. The *elytra* are entirely opaque, except at the lateral margins, and very finely and inconspicuously striate. The *pygidium* is shining and moderately closely punctured. The metasternal shield is acutely angular in front, very smooth and shining, with a longitudinal median groove, and the sides of the *metasternum* are finely and closely punctured.

♂. The head bears a straight slender horn, directed a very little backwards, arising from just in front of the eyes. The pronotum has a slight conical protuberance on each side of the middle line and midway between the front and hind margins. It is hollowed between the two protuberances, smooth and shining in front, and densely and finely granular behind.

♀. The head has a slight conical elevation in front of the eyes, and the pronotum has a pair of slightly transverse tubercles a little behind the front margin and standing a little apart.

Length, 16–22 mm.; breadth, 9–13 mm.

ASSAM: Jorhat (*Desenne*, May, June); Halem (*Mitchell*, Aug.). MALAY PENINSULA. W. CHINA: Szechuen. JAVA.

Type in the Brussels Museum.

50. **Catharsius birmanensis.** (Plate VIII, figs. 4, 5.)

Catharsius birmanensis Lansb., Col. Hefte, xii, 1874, p. 11.

Black and shining, with the basal part of the elytra for about a quarter of their length opaque, and the antennæ, mouth-organs, and hairy clothing of the lower surface and legs red.

Broadly oval and convex. The middle and hind tarsi are broad, the 2nd and 3rd joints of the middle tarsus distinctly transverse, and those of the hind tarsus almost as broad as they are long. The *head* is broadly semicircular, with the *clypeus* finely rugose, and its front margin reflexed and not perceptibly excised in the middle. The *pronotum* is partly (♂) or entirely (♀) covered with closely set minute granules. The front angles are obtuse, the hind angles completely obliterated, and the base is gently rounded and finely margined. The *elytra* are finely but distinctly striate, with scarcely perceptible punctures in the striæ, and the intervals are smooth, except near the base, and scarcely punctured. The *pygidium* is lightly, finely, and not closely punctured. The metasternal shield is bluntly angular in front, very smooth and shining,

with a longitudinal median groove and a deep pit at the base in the middle, and the sides of the *metasternum* are finely and closely punctured and hairy.

♂. The head is shining, very smooth behind, with the clypeus lightly rugose, and bears an erect slender horn arising just in front of the eyes, very slightly dilated behind in its basal half, and gently curved at the end. The pronotum bears a slight, sharp, conical protuberance on each side of the middle line and midway between the front and hind margins. The surface is gently hollowed between the two protuberances, flattened, smooth and shining in front of them, and closely covered with minute granules upon the posterior part, sometimes with a small, smooth, shining patch behind each protuberance.

In reduced male specimens the horn may be short, straight, and regularly tapering, and the anterior, as well as the posterior, part of the pronotum closely granular. In large males the horn is rather feebly serrate on each side behind.

♀. The head is more closely and strongly sculptured, the ocular lobes are covered with granules, and a short, transverse, acuminate elevation arises in front of the eyes. The pronotum is closely covered with minute granules, and has a feebly indicated, short, transverse elevation a little before the middle.

Length, 24–32 mm. ; breadth, 15–19 mm.

BURMA : Mandalay (Pusa Coll., May) ; Teinzo (*L. Fea*, May) ; Tharrawaddy (*G. Q. Corbett*). BHUTAN (*Capt. Pemberton*). SIKKIM : Mangpu (*E. T. Atkinson*).

Type unknown.

51. **Catharsius quadridentatus.** (Plate VII, figs. 3, 4.)

Catharsius quadridentatus Lansb., Ann. Mus. Civ. Genova, (2) ii, 1885, p. 392.

Black, with the antennæ, mouth-organs, tarsi, and hairy clothing of the lower surface red.

Shortly oval and very convex. The *head* is nearly semicircular in shape, finely and closely transversely rugose, with the ocular lobes closely granular and the front margin scarcely perceptibly excised in the middle. The sides of the *pronotum* are strongly rounded, the hind angles entirely obsolete, and the base gently rounded and finely margined. The *elytra* are finely but distinctly striate, with scarcely perceptible punctures in the striæ, the intervals shining, except close to the base, where they are opaque and minutely punctured. The *pygidium* is rather finely and not closely punctured. The metasternal shield is bluntly right-angled in front, almost imperceptibly punctured there, rather more strongly and closely behind, and grooved along the middle,

and the sides of the *metasternum* are closely and rugosely punctured.

♂. The head bears a very long and slender erect horn, arising just in front of the eyes and curving slightly backwards. The pronotum bears four short conical tubercles, the median pair nearly midway between the front and hind margins and separated by a deep depression, the two outer tubercles placed farther forward and nearer to the inner ones than these are to each other. The surface in front of the tubercles is very smooth and shining, and the remaining surface is densely covered with very minute granules.

♀. There is a curved carina just in front of the eyes, which is very slightly elevated in the middle.

Length, 17–23·5 mm.; breadth, 10·5–14 mm.

BURMA: Thayetmyo (*E. Y. Watson*); Minhla (*Comotto*).

Type in the Genoa Museum.

The granulation of the pronotum is distinctly finer and closer in this than in the allied species.

52. **Catharsius capucinus.** (Plate VII, figs. 5, 6.)

Scarabæus capucinus F.,* Spec. Ins. i, 1781, p. 25; Oliv., Ent. i, 3, 1789, p. 117, pl. 2, fig. 12.

Rather larger than *C. pithecius* F., with the clypeus slightly produced, but otherwise identical except for the secondary sexual characters.

♂. The head bears a horn which inclines backward at the base and curves gradually forward to the tip, which is slender, the base dilating a little on each side and forming a narrow, transverse, rectangular plate, with well defined upper angles. The pronotum bears a tubercle on each side of the middle, as in *C. pithecius*, and, in addition, there is another similar tubercle nearer the outer margin and a very little farther forward than the median pair. The hollowed anterior part of the pronotum is very smooth and shining, and the posterior part is closely studded with minute granules, with the exception of a smooth round patch immediately behind each of the inner tubercles.

♀. The head bears a slight transversely triangular elevation, and the pronotum has feeble indications of the four tubercles found in the male.

Length, 18–26 mm.; breadth, 11–15 mm.

BENGAL: Berhampore (*E. T. Atkinson*). BIHAR: Pusa (*G. D. Austin, G. P. Pillai*, June, July). S. INDIA: Mahe, Malabar; Madura; Coconada. CEYLON: Colombo (*G. Lewis*, April); Kandy, 1600 ft. (*G. Lewis*).

Type in the British Museum.

C. capucinus is found in the same localities as *C. pithecius*, to which it is extremely closely related. The male is readily

distinguished by the four tubercles upon the pronotum, and these are usually indicated more or less distinctly in the females. In both sexes the head is a very little longer and narrower than in *pithecius*.

53. **Catharsius pithecius.** (Plate VII, figs. 1, 2.)

Scarabæus pithecius F.,* Syst. Ent. 1775, p. 21.
Scarabæus sabæus F.,* Spec. Ins. i, 1781, p. 23.
Scarabæus nanus F., Ent. Syst. i, 1792, p. 42.
Copris sinensis Hope,* Proc. Ent. Soc. Lond. 1842, p. 60.
Copris cribricollis Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208.

Black and shining, with the pronotum partly or entirely opaque, the antennæ, mouth-organs, and hairy clothing of the legs and lower surface reddish.

Shortly oval and very convex. The *head* is nearly semicircular in shape, with the *clypeus* very feebly excised in the middle of the front margin and closely strigose. The ocular lobes are closely granular. The sides of the *pronotum* are strongly and uniformly rounded, the front angles are generally distinct and the hind angles entirely obliterated, and the base is gently rounded and finely margined. The *elytra* are finely but distinctly striate, with scarcely perceptible punctures in the striæ, the intervals shining, except near the base, where they are opaque and very minutely punctured. The *pygidium* is finely and not very closely punctured. The metasternal shield is acutely angular in front, very smooth and shining, with a median longitudinal groove, and the sides of the *metasternum* are closely and rugosely punctured and hairy.

♂. The head is lightly sculptured and shining, and bears a nearly straight slender horn, arising just in front of the eyes, and inclined very slightly backwards. The pronotum bears a slight, sharp, conical protuberance on each side of the median line and midway between the front and hind margins. The surface is gently hollowed between the two points, flattened, smooth and shining in front of them, and closely covered with minute granules upon the posterior part, usually with a round, smooth, shining patch behind each lateral protuberance. The two smooth patches may become enlarged and united or, especially in poorly developed specimens, may be very small or entirely absent.

♀. The head is more deeply sculptured and less shining, and bears a slightly acuminate transverse elevation just in front of the eyes. The pronotum has a median longitudinal furrow in its basal part, and is closely covered with minute granules, sometimes absent from a smooth basal area on each side of the median furrow.

Length, 15–23 mm.; breadth, 10–13·5 mm.

Bihar : Pusa (*T. Bainbrigge Fletcher*, May–Sept.) ; Chapra (*Mackenzie*). U. Prov. : Benares (*C. S. Misra*, Sept.) ; Bareilly, (Aug.) ; Dehra Dun (*C. F. C. Beeson*, July). C. Prov. : Nagpur, 1000 ft. (*E. A. D'Abreu*, July–Sept.). S. India : Bangalore, 3000 ft. (*Anstead*, Sept.) ; Coimbatore (*P. V. Isaac*, Aug. ; *K. A. Nayagam*, Sept.–Dec.) ; Temmiganur, Bellary District (*T. V. Ramakrishna*, Aug.) ; Kodumur, Kurnool District (Aug.) ; Parur, S. Arcot (Aug.) ; Manaparai, Trichinopoly District. Ceylon : Tamblegam (*E. E. Green*, Sept.) ; Kitulgala, 1000 ft. (*G. Lewis*, Jan.) ; Kandy, 1600 ft. (*G. Lewis*).

Types of *C. pithecius*, *sabæus*, *sinensis*, and *cribricollis* in the British Museum ; that of *C. nanus* in the Copenhagen Museum.

This is a very abundant species throughout the greater part of India.

54. **Catharsius inermis.**

Copris inermis Cast., Hist. Nat., Col. ii, 1840, p. 78.
Catharsius inermis Har., Mitth. Münch. Ent. Ver. ii, 1878, p. 41.

Black, moderately shining above, with the antennæ, mouth-organs, tarsi, and hairy clothing of the legs and lower surface reddish.

Broadly oval and moderately convex. The *head* is very broad and transversely rugose, more finely behind than in front, with the ocular lobes granular. The front margin is rounded, with a feeble excision in the middle, and there is a short conical tubercle midway between the front margins of the eyes. The *pronotum* is finely asperately punctured in the middle, the punctures coalescing and becoming rugose elsewhere. There is a slight longitudinal median groove upon the basal half. The front angles are represented by broad rounded lobes, the lateral margins are well rounded, the hind angles obliterated and the base feebly curved and finely margined. The *elytra* are clearly striate, with fine punctures in the striæ, the intervals slightly convex and minutely punctured, the basal part opaque. The *pygidium* bears rather close and strong transverse punctures. The *mesosternum* is strongly and closely punctured, the metasternal shield scarcely angulate in front, finely and sparsely punctured, with a median longitudinal groove, and the sides of the *metasternum* are sparingly striolate and hairy.

♂. The cephalic tubercle is generally a very little sharper than in the female, and the inner angle of the front tibia is produced into a finger-like process a little bent downwards.

Length, 10–15 mm. ; breadth, 6·5–9·5 mm.

Sind : Karachi (*Maindron*, Aug., Sept.). Arabia. Abyssinia. West Africa.

LIBRARY

Genus COPRIS.

Copris Geoffroy, Ins. des Env. de Paris, 1762, p. 87; Fourcroy, Ent. Paris, i, 1785, p. 13; Lacord., Gen. Col. iii, 1856, p. 96.

Type, *Scarabæus lunaris* L.

Range. Europe, Africa, Asia, Malay Archipelago.

Body compact, convex or a little depressed, without hairy clothing above, the legs not long, the antennæ 9-jointed. Head broad, more or less semicircular, the clypeus fused with the ocular lobes, the front margin often feebly notched in the middle. Pronotum broad and transverse, the front angles usually broadly rounded and the hind angles obsolete, the front margin furnished with a membranous fringe, usually very narrow but sometimes broad and conspicuous, the hind margin with a deep groove. Scutellum wanting. Elytra not very short, bearing eight striæ and a single lateral carina. Meso-metasternal line angulate in the middle, the metasternum rather long. Abdomen very short. Middle coxæ long and nearly parallel. Femora very thick. Front tibia armed with four, or occasionally only three, external teeth. Front tarsi very short. Middle and hind tibiæ short, broadly dilated at the posterior end, the middle tibia without and the hind tibia with a strong transverse outer carina. Middle and hind tarsi rather short, the basal joint about twice as long as the 2nd. Mandible moderately long, with a long hairy fringe at the end. Maxilla not long, with a broad terminal lobe and slender palpus. Mentum more or less transverse, the palpi far apart, with the basal joint rather long and narrow, the 2nd short, the 3rd very small.

Lacordaire attaches much importance to the shape of the labial palpi as a distinguishing feature of the genus *Copris*, and states that the first two joints are dilated. The basal joint in those I have examined is narrow, although broadly fringed with bristles. The 2nd joint is very short and broad, and the proportions of the three joints are very different from those found in *Onthophagus* and the genera most nearly allied to it.

Key to the Species of Copris.

1 (34) Pronotum with sharply defined anterior declivity.
2 (9) Pronotum closely punctured or rugose (the anterior declivity sometimes excepted).
3 (6) Elytra not very shining.
4 (5) Elytra not distinctly punctured. .... ***sacontala*** **Redt., p. 104.**
5 (4) Elytra closely punctured .... ***sabinus*** **Gill., p. 105.**
6 (3) Elytra very shining.
7 (8) Front angles of prothorax very blunt. ***indicus*** **Gill., p. 106.**

8	(7)	Front angles of prothorax sharp	*hispanus* L., p. 107.
9	(2)	Pronotum very unequally or scarcely at all punctured.	
10	(11)	Pronotum without a longitudinal groove	*iris* Sharp, p. 108.
11	(10)	Pronotum with a longitudinal groove.	
12	(29)	Clypeus evenly punctured or rugose.	
13	(14)	Front tibia bearing three external teeth	*lævigatus* Gill., p. 109.
14	(13)	Front tibia bearing four external teeth.	
15	(20)	Pygidium strongly punctured.	
16	(19)	Elytral intervals very smooth, scarcely perceptibly punctured.	
17	(18)	Front angles of the pronotum not distinct	*carinicus* Gill., p. 109.
18	(17)	Front angles of the pronotum distinct.	*sarpedon* Har., p. 110.
19	(16)	Elytral intervals finely but distinctly punctured	*punctatus* Gill., p. 111.
20	(15)	Pygidium not strongly punctured.	
21	(22)	Sides of the metasternum closely hairy	*magicus* Har., p. 112.
22	(21)	Sides of the metasternum with scanty hair or none.	
23	(28)	Elytra deeply striate.	
24	(27)	Spur of the front tibia not bent towards the end.	
25	(26)	Punctures in the elytral striæ close together	*spinator* Har., ♀, p. 114.
26	(25)	Punctures in the elytral striæ not close together	*sodalis* Walk., p. 114.
27	(24)	Spur of the front tibia bent towards the end	*sinicus* Hope, p. 115.
28	(23)	Elytra feebly striate	*repertus* Walk., p. 116.
29	(12)	Clypeus smooth or with only a few punctures at the sides.	
30	(31)	Clypeus punctured at the sides	*delicatus*, sp. n., p. 117.
31	(30)	Clypeus quite smooth.	
32	(33)	Small; elytra deeply striate	*spinator* Har., ♂, p. 113.
33	(32)	Large; elytra lightly striate	*corpulentus* Gill., p. 118.
34	(1)	Pronotum without sharply defined anterior declivity.	
35	(52)	Pronotum with median groove or line.	
36	(45)	Elytral intervals shining, not distinctly punctured.	
37	(40)	Front angles of prothorax deeply hollowed beneath.	
38	(39)	Black	*doriæ* Har., p. 119.
39	(38)	More or less metallic	*reflexus* F., p. 120.
40	(37)	Front angles of prothorax not deeply hollowed beneath.	
41	(44)	Pronotum not entirely nor evenly punctured.	
42	(43)	Clypeus feebly notched	*numa* Gill., p. 121.
43	(42)	Clypeus acutely notched	*confucius* Har., p. 122.
44	(41)	Pronotum entirely and rather evenly punctured	*bengalensis* Gill., [p. 122.
45	(36)	Elytral intervals distinctly punctured.	
46	(47)	Elytral intervals punctured behind only	*compressipennis* Gill., [p. 123.

47 (46) Elytral intervals uniformly punctured.
48 (51) Elytral intervals convex, finely punctured.
49 (50) Clypeal margin with one process ..... *imitans* Felsche, p. 124.
50 (49) Clypeal margin with two processes ... *excisus* Wat., p. 125.
51 (48) Elytral intervals flat, strongly punctured ..... *punctulatus* Wied., [p. 126.
52 (35) Pronotum without median groove or line.
53 (56) Elytral intervals not very closely punctured.
54 (55) Pronotum rather densely punctured, the front margin not prominent in the middle ..... *andrewesi* Wat., p. 127.
55 (54) Pronotum very densely punctured, the front margin prominent in the middle ..... *punjabensis* Gill., [p. 128.
56 (53) Elytral intervals closely punctured.
57 (60) Clypeus strongly punctured.
58 (59) Pronotum and elytra very finely punctured ..... *ramosiceps* Gill., p. 128.
59 (58) Pronotum and elytra strongly punctured ..... *cribratus* Gill., p. 129.
60 (57) Clypeus rather smooth.
61 (62) Metasternal shield not smooth behind .. *furciceps* Felsche. [p. 130.
62 (61) Metasternal shield smooth behind.
63 (64) Metasternal shield unpunctured ..... *signatus* Walk., p. 131.
64 (63) Metasternal shield punctured in front.
65 (68) Head with well-marked horn or frontal tubercle.
66 (67) Elytral intervals very closely punctured ..... *surdus*, sp. n., p. 132.
67 (66) Elytral intervals rather closely punctured ..... *davisoni* Wat., p. 132.
68 (65) Head without well-marked horn or frontal tubercle ..... *anomiopseoides* Bouc., [p. 133.

55. **Copris sacontala.** (Plate IX, figs. 15, 16.)

Copris sacontala Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 519.

Black, not shining, with the antennæ, mouth-organs, and hairy clothing of the legs and lower surface red.

Broadly oval and very convex. The *head* is rather short and broad, rugose, except between the eyes, and very feebly notched in the middle of the front margin. The *pronotum* is entirely rugose, coarsely in front and more finely and closely behind, with a feeble longitudinal groove in the posterior part. The sides are strongly rounded, the front angles truncate and the hind angles entirely obsolete. The *elytra* are very finely and obsoletely striate, some of the striæ with traces of minute punctures. The intervals are flat and finely alutaceous. The *pygidium* is fairly closely covered with rather ill-defined punctures. The metasternal shield is rather smooth in front, with a deep transverse impression, and closely and rugosely punctured behind, and the sides of the

metasternum are densely punctate, rugose, and clothed with hair. The front tibia is broad and bears three external teeth, and the middle and hind tibiæ are digitate at the extremity.

♂. The head bears a curved and tapering, rather sharp-pointed horn, quadrangular and rugose in its basal part. The pronotum has a nearly vertical anterior declivity, the upper edge of which bears two blunt prominences placed close together, and there is also a sharp lateral tooth on each side, separated by a slight hollow from the dorsal prominence.

In large specimens the cephalic horn is as long as the prothorax, the median lobes of the pronotum are large and divergent, and the anterior declivity is smooth and shining. In smaller specimens the declivity is coarsely wrinkled and the lobes may become very feeble.

♀. The head bears a transverse carina, sharp at the summit, broad at the base, and rather oblique in direction, the summit obtusely angular and the outer angles sharp. The pronotum has a short anterior declivity, the upper edge of which has a slightly curved carina in the middle. The elytra are rather more shining than those of the male.

Length, 21–27 mm. ; breadth, 13–16 mm.

PUNJAB : Thobba, Murree Hills (*Major Howland Roberts*). U. PROV. : W. Almora (*H. G. Champion*, May–Aug.) ; Ranikhet (*H. G. Champion*, June–Aug.) ; Allahabad ; Almora, Kali Valley, 8–10,000 ft. (*R. N. Parker*, July).

Type in the Vienna Museum.

56. **Copris sabinus.** (Plate IX, figs. 3, 4.)

Copris sabinus Gillet,* Notes Leyd. Mus. xxxii, 1910, p. 17.

Black, closely punctured, not shining above, with the antennæ, mouth-organs, and scanty hairs upon the legs and the sides of the body beneath red.

Broadly oval and very convex. The *head* is semicircular, with the front margin scarcely at all indented in the middle, the surface granular, but the granules obsolete in the middle. The *pronotum* is densely and rugosely punctured, except in the posterior dorsal part, where the punctures are close but separate, and in the lateral excavations of the male, which are entirely smooth. There is a strong median groove in the posterior part, the lateral margins are strongly rounded, the front angles broadly rounded, and the hind angles entirely obsolete. The *elytra* are deeply striate, the intervals slightly convex and closely punctured. The *pygidium* is closely punctured. The front angles of the prothorax are hollowed, smooth and shining beneath. The metasternal shield is almost smooth, with

a few feeble punctures at its sides and a pit in front, and the sides are strongly punctured. The front tibia is broad and bears three external teeth, and all the femora are finely and moderately closely punctured.

♂. The head bears a slender erect horn. The front of the pronotum is almost vertical in the middle, the dorsal hump is narrow and bilobed, and there is a sharp lateral process on each side, separated from the dorsal hump by a deep smooth excavation.

♀. The head bears a short transverse carina and the pronotum is strongly convex, without carina, and entirely opaque and closely sculptured.

Length, 17·5–20 mm.; breadth, 10–11 mm.

UNITED PROV.: Mussoorie, 7000 ft. (*Col. Harcourt*, June).

Type in Dr. Gillet's collection.

57. **Copris indicus.** (Plate X, figs. 4, 5.)

Copris indicus Gillet,* Notes Leyd. Mus. xxxii, 1910, p. 5; Ann. Soc. Ent. Belg. v, 1911, p. 314.

Black, with the anterior part strongly and densely punctured and the elytra very shining, sometimes with a faint opalescent lustre, the antennæ, the mouth-organs, and the bristles upon the legs red.

Broadly oval and highly convex. The *head* is semicircular in shape, with the front margin feebly bilobed in the middle. The surface is closely punctured, rugosely in front, less closely between the eyes. The *pronotum* is strongly and densely punctured, the sides are nearly straight in front, strongly rounded behind, the front angles are broadly truncate and the hind angles very obtuse. The *elytra* are very strongly sulcate, the sulci closely and not very finely punctured, the intervals convex and finely and sparingly punctured. The *pygidium* is not very strongly nor very closely punctured. The metasternal shield is rather vaguely punctured in front and nearly smooth behind, with a median groove, and the sides of the *metasternum* are strongly but not very closely punctured. The front angles of the prothorax are not hollowed beneath. The front tibia is broad and armed with four blunt external teeth, and the terminal spur has the tip bent almost at a right angle. The femora are punctured beneath, the front ones rather more strongly than the rest.

♂. The head bears a short erect horn in the middle, flattened from front to back, slightly dilated and feebly bicuspid at the extremity. The front of the pronotum is vertical in the middle and the front edge of the dorsal prominence is nearly straight. There is also a sharp lateral tubercle on each side of the pronotum.

♀. The head bears a slight transverse elevation in the middle. There is a rudimentary transverse elevation parallel to the front margin of the pronotum.

Length, 12·5–15·5 mm. : breadth, 7·5–9·5 mm.

MADRAS : Barkuda I., Lake Chilka, Ganjam Dist. (*N. Annandale*, July). MYSORE : Bangalore (*T. H. L. Grosvenor*, June). TRAVANCORE : Trivandrum (*E. T. Atkinson*, May). CEYLON : N. Prov., Vavuniya (Dec.).

Type in Dr. Gillet's collection.

In the Junk Catalogue Dr. Gillet has called this species *Copris fricator* F., but the specimen in the Glasgow University Museum believed to be the type of that species is the North American insect known as *C. anaglypticus*.

58. **Copris hispanus.** (Plate IX, figs. 13, 14.)

Scarabæus hispanus L., Mus. Lud. Ulr. 1764, p. 12 ; Oliv., Ent. i, 3, 1789, p. 113, pl. 6, fig. 47.

Black and shining, with the antennæ, mouth-organs, and the stiff hairs upon legs and lower surface red.

Oval and highly convex. The *head* is broad and closely rugose or granular, with the clypeal margin sharply notched in the middle but scarcely bilobed. The head bears a strong horn curving backward, quadrate in section near the base and moderately sharp at the tip. The *pronotum* slopes steeply in front, the upper edge of the declivity forming a sharp carina, and the surface in front of this is closely rugose. The sides of the pronotum are closely tuberculate and the median dorsal region is rather unevenly punctured. The front angles are acutely produced, the lateral margins nearly straight in front, more or less bisinuate behind, the hind angles distinct but obtuse and the base very bluntly angular in the middle. The *elytra* are striate, the striæ finely punctured and the intervals slightly convex and finely and sparsely punctured. The *pygidium* is moderately finely and closely punctured. The metasternal shield is transversely impressed in front, rugose and hairy at the sides, and smooth in the middle, where it is longitudinally grooved. The sides of the *metasternum* are rugose and hairy. The front tibia is broad and bears four external teeth, and the femora are not very strongly punctured.

The two sexes are similar, but well developed males have a longer and more strongly curved horn than that of the female, the anterior declivity of the pronotum is longer and the thoracic ridge more prominent and more sinuous, sometimes with feeble angulations in the middle and on each side.

Length, 18–28 mm. ; breadth, 11–17 mm.

SIND : Karachi (*Cumming*). PERSIA. TURKESTAN. SYRIA.

TURKEY. CYPRUS. S. RUSSIA. GREECE. ITALY. S. FRANCE. SPAIN. ALGERIA. TUNIS.

Type in the Upsala Museum.

The habits of this species, described at length by Fabre in his 'Souvenirs Entomologiques,' v, 1897, p. 103, which account has been supplemented by Sijazov, Rev. Russe Ent. xiii, 1913, p. 113, are outlined in the introductory pages of this volume.

59. **Copris iris.** (Plate IX, figs. 9, 10; Plate X, figs. 15, 16, 17.)

Copris iris Sharp, Col. Hefte, xiii, 1875, p. 45.

Smooth, shining black. Moderately elongate and very convex. The *head* is evenly rounded in front, rather strongly and evenly but not closely punctured, with the margin strongly reflexed and scarcely perceptibly notched in the middle. The *pronotum* is very unevenly punctured, rather smooth in the basal part and without a longitudinal median groove, the front angles are slightly obtuse and the sides are strongly rounded and reflexed. The *elytra* are rather deeply striate, with faint minute punctures in the striæ, and the intervals are almost flat, shining except at the base, and very sparsely and minutely punctured. The *pygidium* is shining and sparsely punctured. The metasternal shield is entirely smooth and the sides of the *metasternum* are strongly punctured.

♂. The head bears a long, recurved, and pointed horn. The anterior part of the pronotum is hollowed and coarsely punctured, and the elevated basal part is smooth and unpunctured. At the highest development this basal part forms a narrow strip limited in front by a sharp carina parallel to the base, the retuse anterior part extending almost from side to side. In specimens of minor development the carina bends round on each side, enclosing a smaller hollowed area, and in the lowest stage of development the excavation is rather narrow and the carina is interrupted in the middle, the excavation approaching close to the base. In well developed specimens there is a sharp tooth in the middle of the front margin of the pronotum.

♀. The cephalic horn is very short but pointed. The pronotum is convex, and bears a pair of slight tubercular elevations a little behind the front margin. In front and a little behind these the surface is closely rugose, becoming coarsely punctured about the middle and nearly smooth near the base. There is a small smooth area exactly in the middle.

Length, 20–24 mm.; breadth, 11–14·5 mm.

BURMA: Rangoon (*E. T. Atkinson*); Tenasserim (*Helfer*). INDO-CHINA. MALAY PENINSULA.

Type in M. René Oberthür's collection.

60. **Copris lævigatus.**

Copris lævigatus Gillet,* Ann. Soc. Ent. Belg. lxvii, 1927, p. 252.

Black, smooth and shining, with scanty red hairs at the sides of the body beneath and upon the legs, with the antennæ and mouth-organs of the same colour.

Oval and convex. The *head* is broadly semicircular, with the ocular lobes punctured and the *clypeus* lightly rugulose and very feebly bidentate in the middle. The *pronotum* has a faint median groove in its posterior part and is very finely and scantily punctured dorsally, the punctures becoming gradually stronger and closer towards the sides, where they are subrugose. The lateral margins are well rounded, the front angles broadly rounded, and the hind angles obsolete. The base is slightly angulate in the middle. The *elytra* are deeply striate, the striæ finely and closely punctured and the intervals slightly convex and finely but not very sparsely punctured. The *pygidium* is rather strongly punctured. The front angles of the thorax are slightly hollowed beneath. The metasternal shield is smooth, with an impression near the front margin, and the sides of the *metasternum* are strongly punctured and scantily hairy. The front tibiæ are broad and tridentate externally, and the femora are finely and not very closely punctured.

♂. The head bears a simple erect horn. The pronotum is smooth in front and almost vertical, and the edge of the declivity bears four nearly equidistant fine prominences in a line, the two inner ones closely united and separated by slight hollows from the outer ones.

♀. Unknown.

Length, 16 mm. ; breadth, 10 mm.

Assam : Manipur.

Type in Dr. J. J. Gillet's collection.

61. **Copris carinicus.**

Copris carinicus Gillet,* Notes Leyd. Mus. xxxii, 1910, p. 8.

Black and shining, with the *antennæ*, the *mouth-organs*, and scanty hairs upon the legs red.

Rather broadly oval and highly convex. The *head* is closely and rugosely punctured, the *clypeus* narrowly notched in the middle and feebly bilobed. The *pronotum* is strongly and closely punctured, except in front and in the middle of the basal part, where the punctures are rather feeble. There is a deep median longitudinal groove posteriorly. The lateral margins are evenly rounded, the front angles broadly lobed, and the hind angles obsolete. The *elytra* are deeply striate, the striæ finely and closely punctured, and the intervals slightly convex and minutely and sparsely punctured.

The *pygidium* is fairly strongly and closely punctured. The metasternal shield is very smooth, and the sides of the *metasternum* are punctured, but not very strongly or closely. The front tibia is broad and bears four teeth, and all the femora are rather evenly punctured.

♂. The head bears a rather slender, laterally compressed horn in the middle. The front of the pronotum is steep, and the upper edge of the declivity bears two minute prominences near the middle, not very far apart, and two on each side rather farther from each other and from those in the middle.

♀. The head bears a short transverse carina. The pronotum bears a straight transverse carina parallel to and not far behind the front margin.

Length, 16–17·5 mm. ; breadth, 8·5–10 mm.

ASSAM : Shillong (*H. M. Parish*, June) ; Manipur (*W. Doherty*). BURMA : Maymyo (*H. L. Andrewes*) ; Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec., Jan.) ; Asciuii Ghecu, 4200–4500 ft. (*L. Fea*, Mar., April) ; Kolaw, S. Shan States, 4000 ft. (*F. M. Mackwood*, Apr.) ; Tavoy (*W. Doherty*).

Type in Dr. J. J. Gillet's collection ; co-type in the Genoa Museum.

62. **Copris sarpedon.** (Plate IX, figs. 1, 2.)

Copris sexdentatus Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 520 (preoccupied).
Copris sarpedon Har., Col. Hefte, iv, 1868, p. 104.
Copris pompilius Wat.,* Trans. Ent. Soc. Lond. 1875, p. 75.

Black and very shining, with the antennæ, the mouth-organs, and scanty bristles upon the legs red.

Oval and highly convex. The *head* is semicircular, strongly and moderately closely punctured, with the front margin reflexed and feebly notched in the middle. The *pronotum* is very strongly but unevenly punctured, with a deep median longitudinal groove, on each side of which the punctures are fine and sparse. The lateral margins are strongly rounded, the front angles broadly truncate, and the hind angles obsolete. The *elytra* are very deeply striate, the striæ closely punctured, the intervals convex and minutely but not very sparsely punctured. The *pygidium* is evenly and very strongly punctured. The metasternal shield is smooth, with a deep pit and a very few fine punctures in front and a longitudinal groove behind. The sides of the *metasternum* are fairly strongly but not closely punctured and without hair. The front tibia is broad and armed with four teeth, and the extremity of the terminal spur is bent almost at a right angle. All the femora are moderately closely punctured.

♂. The head bears a slender horn, smooth in front and rugose

behind, with a minute posterior tooth on each side at a short distance from the base. The pronotum is steep in front, and has a quadrate dorsal prominence, the front edge of which bears four equidistant points, the two middle ones more deeply separated from each other than from the outer ones. There is also a long, sharp, compressed lateral process on each side of the pronotum, separated by a deep, strongly punctured excavation from the dorsal hump. In small individuals the lateral process may be reduced to a slight blunt prominence.

♀. The head bears a short transverse carina with rather sharp angles. The pronotum bears a transverse, feebly sinuate carina, parallel to and a little behind the front margin.

Length, 12–17·5 mm. : breadth, 7–10 mm.

KASHMIR : Batote, Udhampur Div., 5500 ft. (*B. M. Bhatia*, May). PUNJAB : Thobba, Murree Hills (*Major Howland Roberts*) ; Dalhousie. U. PROV. : Mussoorie, 6500 ft. (*J. C. M. Gardner*, June, July) ; Kemti Falls, Mussoorie (*Dr. M. Cameron*, May) ; Dhobi Ghat (*M. Bose*, April) ; Kanasar, Chakrata District, 7050 ft. (*S. N. Chatterjee*, May) ; W. Almora, Kumaon (*H. G. Champion*, June, Oct.) ; Ranikhet (*H. G. Champion*, June, Aug.). ASSAM : Shillong (*F. W. Champion*) ; Sylhet. NEPAL (*Maj.-Gen. Hardwicke*). SIAM.

Type (of Redtenbacher) in the Vienna Museum ; that of *pompilius* in the British Museum. Harold only renamed the species.

A small but important character of this species is the rectangularly bent front tibial spur.

63. **Copris punctatus.**

Copris punctatus Gillet,* Notes Leyd. Mus. xxxii, 1910, p. 4.

Shining black, with the antennæ and legs deep red, the lower surface only very scantily clothed with reddish setæ.

Very convex, rather short and broad. The *head* is strongly and rugosely punctured, with the outline semicircular, and very feebly bidentate in the middle of the front margin. The *pronotum* is strongly and closely but unevenly punctured, with a rather strong, narrow, median groove, the punctures rather rugose at the front and sides and rather fine on each side of the median groove. The sides are strongly and rather unevenly rounded, the front angles obliquely truncate, and the hind angles almost obsolete. The front angles are not hollowed beneath. The *elytra* are deeply striate, the striæ closely and not very finely punctured and the intervals scarcely convex, finely but distinctly and not very sparsely punctured. The *pygidium* is rather strongly and closely punctured. The metasternal shield has a deep median groove

and a round pit in front, but bears only very minute and scanty punctures. The sides are strongly punctured and bear short scanty setæ. The front tibiæ are broad and armed with four external teeth. The femora are rather strongly and closely punctured.

♂. The head bears a slender erect horn, with a minute tooth behind near the base on each side. The pronotum has a quadrate dorsal hump, with a nearly straight front edge, pointed at each end and bearing two minute prominences close together in the middle. There is also a sharp, oblique, lateral process on each side.

♀. The head bears a slightly elevated, short, transverse carina, a little emarginate at its summit. The pronotum bears a feebly curved transverse carina close behind the front margin.

Length, 14–15·5 mm. ; breadth, 8–9 mm.

BURMA : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.) ; Pakokku Hill Tracts, 6500 ft. (*B. Fischer*, June). SIAM.

Type in Dr. Gillet's collection.

64. **Copris magicus.** (Plate IX, figs. 11, 12.)

Copris magicus Har., Mitth. Münch. Ent. Ver. v, 1881, p. 88.

Black and shining, with the antennæ, mouth-organs, and hairy clothing of the legs and the sides of the body beneath red.

Broadly oval and very convex. The *head* is semicircular, with the *clypeus* strongly punctured in the male, coarsely rugose in the female, its front margin sharply notched in the middle. The *pronotum* is very shining, with a strong longitudinal groove along the middle, the sides straight in front, strongly rounded behind, the front angles broadly truncate, and the hind angles obsolete. The *elytra* are deeply sulcate, the sulci finely and closely punctured and the intervals gently convex and finely punctured. The metasternal shield is very smooth and has a fine longitudinal groove and a deep pit near the front margin. The sides of the *metasternum* are closely punctured and hairy. The front tibia is broad and armed with four external teeth, and the terminal spur is feebly curved. The front femur is rather closely punctured and the middle and hind femora are very feebly punctured.

♂. The clypeus is deeply but not coarsely punctured and shining, and there is a slender, backwardly curved horn, with a minute posterior tooth on each side at a short distance from the base. The pronotum is nearly vertical in front and the dorsal elevation is rather narrow but a little dilated at its front margin, which forms a straight carina interrupted in the middle by the longitudinal groove. On each side of the dorsal elevation there is a deep shining excavation, the outer

margin of which is produced obliquely forward as a compressed pointed process, at the base of which is an erect blunt lamina. In well developed males the puncturation is very fine and sparse, except in the median and basal grooves. In small males the horn is short, the dorsal and lateral thoracic processes are feeble, and the intervening hollows are shallow and strongly punctured, as well as the front declivity and the front angles.

♀. The clypeus is coarsely and unevenly rugose, and the head bears an erect quadrate lamina, with its upper edge emarginate. The pronotum bears a straight carina parallel with the front margin and not interrupted by the median groove, and a slight tubercle at a little distance from it on each side. Behind the carina, and between it and the front angles, the surface is strongly and closely punctured.

Length, 18–21 mm. ; breadth, 10–12 mm.

SIKKIM : Mangpu (*E. T. Atkinson*) ; Gopaldhara, Rungbong Valley (*H. Stevens*). ASSAM : Kohima, Naga Hills, 5700 ft. (April) ; Manipur (*W. Doherty*). BURMA : Mandalay (*L. Fea*, Dec.) ; Kachin Cauri (*L. Fea*, Aug., Nov.,) ; Pangsari, N. Tawngpeng, 4660 ft. (*J. Coggin Brown*, Feb.) ; Kanpetlet, Pakokku Hill Tracts, N. Shan States, 6500 ft. (*B. Fischer*). YUNNAN. TONKIN.

Type in M. René Oberthür's collection.

This species is closely related to *C. lunaris* of Great Britain and western Europe, and has, no doubt, similar habits.

65. **Copris spinator.**

Copris spinator Har., Mitth. Münch. Ent. Ver. v, 1881, p. 89 ; Gill., Ann. Soc. Ent. Belg. 1911, p. 291.
Copris haroldi Lansb., Tijds. Ent. xxix, 1886, p. 15.

Black and shining, with the antennæ, mouth-organs, and scanty hairs upon the legs and lower surface reddish.

Broadly oval and very convex. The *head* is smooth and shining in the male, slightly rugose in the female, and the *clypeus is notched in the middle of its front margin and* scarcely bilobed. The *pronotum* is finely and sparsely punctured here and there, with a deep longitudinal groove upon its posterior part. Its sides are almost straight in front, strongly rounded behind, the front angles are truncate, and the hind angles obsolete. The *elytra* are deeply striate, the striæ finely punctured and the intervals rather convex and very smooth. The *pygidium* is lightly, finely, and sparingly punctured. The metasternal shield has a median pit and a few light punctures anteriorly and is very smooth behind, and the sides of the *metasternum* are fairly closely asperately punctured. The front tibia bears four external teeth.

♂. The head is very smooth and shining and bears a long, erect, curved, and rather compressed horn. The pronotum

is very deeply hollowed on each side, with a few punctures in the hollows, the median process is produced into two strong sharp points, and the front angles also bear two similar but stronger processes, directed forward and upward and extending in front of the anterior margin, with a deep basal groove externally. The vertical anterior face of the median prominence is carinate in the middle and the dorsal groove is narrow behind.

♀. The head is rather rugose and bears a strong, erect, median, transverse lamina, a little produced at each angle. The pronotum is hollowed in front on each side, and the median prominence is truncate and vertical in front. There are a few punctures in the lateral hollows and behind them, upon the front angles, and the anterior part of the median prominence. The median groove is very narrow.

Length, 13–17 mm.; *breadth*, 7·5–9·5 mm.

NICOBAR IS. MALAY PENINSULA. BORNEO.

Type in M. René Oberthür's collection.

I have described this from male and female examples found in the Malay Peninsula. I have not seen any specimen from the Nicobar Is., the habitat of the type. That specimen is rather larger (17 mm. long) than any known Malayan example, and has a stronger median ridge upon the anterior declivity of the pronotum in the male, the only sex hitherto described.

66. **Copris sodalis.**

Copris sodalis Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208.
Copris taprobanus Gill.,* Notes Leyd. Mus. xxxii, 1910, p. 9 (new syn.).

Black, very smooth and shining, with the antennæ, mouth-organs, and scanty hairs upon the legs and the sides of the body beneath red.

Shortly oval and very convex. The *head* is rather finely and rugosely punctured but shining, with the front margin of the *clypeus* slightly cleft in the middle. The *pronotum* is almost unpunctured, but with fine sparse punctures in its anterior part and rather larger punctures in the front angles. There is a fine median groove in the posterior part of the pronotum, the lateral margins are regularly rounded, the front angles broadly truncate and the hind angles obsolete. The *elytra* are deeply sulcate, the sulci distinctly punctured, the intervals convex and scarcely visibly punctured. The *pygidium* is fairly strongly but not closely punctured. The metasternal shield is unpunctured, with a deep impression at its front margin, and the sides are rather strongly but not closely punctured. The front tibiæ are armed with four teeth and not very broad. The front femora are fairly

closely, the middle and hind femora more finely and not closely punctured.

♂. The head bears a slender erect horn, with a minute tooth behind on each side at a short distance from the base. The pronotum slopes steeply in front, and has a cluster of punctures in the middle and an excavation on each side, the upper edge of the declivity bearing four short, nearly equidistant, slight prominences in a straight line. There is also a minute lateral process on each side.

♀. The head bears a slight transverse elevation, truncate at its summit and slightly acuminate on each side. The pronotum has a slight, straight, transverse carina just behind the front margin, and is feebly punctured both before and behind it.

Length, 15 mm.; breadth, 8·5 mm.

CEYLON: Kandy (Oct.); Urugala, N. Prov. (*G. M. Henry*, April); Rangala (*G. M. Henry*, April).

Type in the British Museum; that of *taprobanus* in Dr. J. J. Gillet's collection.

67. **Copris sinicus.** (Plate IX, figs. 5, 6.)

Copris sinicus Hope,* Proc. Ent. Soc. Lond. 1842, p. 60; Wat., Ann. Mag. Nat. Hist. (16) vii, 1891, p. 512; Gill., Ann. Soc. Ent. Belg. lv, 1911, p. 314.

Copris sulcicollis Lansb., Tijds. Ent. xxix, 1886, p. 10.

Black and shining, with the antennæ, mouth-organs, and the bristles upon the legs red.

Oval and highly convex. The *head* is nearly semicircular, with the *clypeus* rugulose, the ocular lobes strongly punctured, and the vertex between the eyes lightly punctured, the clypeus deeply notched in the middle, with a slight lobe on each side of the notch. The *pronotum* is very shining, with a strong longitudinal groove along the middle. The sides are strongly rounded, the front angles truncate, and the hind angles almost obsolete. The *elytra* are fairly deeply striate, with the striæ finely and closely punctured, the intervals almost flat and scarcely perceptibly punctured. The *pygidium* is not very strongly nor very closely punctured. The metasternal shield is very smooth, and the sides of the *metasternum* are rather finely punctured and sparsely setose. The front tibia is broad and armed with four external teeth, the front femur is closely punctured, and the four posterior femora fairly closely upon the outer half. The front tibial spur is strongly hooked at the end.

♂. The head bears a slender compressed horn, with a minute tooth behind on each side at a short distance from the base. The anterior part of the pronotum has a sharp declivity and is feebly punctured in the middle. The upper edge of the

declivity bears a slight tooth on each side, far apart from each other, and, except in poorly developed specimens, two more minute teeth close together in the middle. The posterior elevated part is lightly punctured at the side, and the anterior angles are very strongly punctured.

♀. The head bears a short, transverse, elevated carina and the pronotum has a steep, but short, anterior declivity, the upper margin of which is straight and parallel to the front margin of the thorax. The part of the pronotum immediately behind the transverse carina is fairly closely punctured, and the lateral part to the front angles very closely and strongly.

Length, 14–21 mm.; breadth, 8–11 mm.

C. PROV.: Sarda (*F. W. Champion*). BURMA: Rangoon (May); Maymyo (*H. L. Andrewes*); N. Chin Hills; Palon, Pegu (*L. Fea*, Aug., Sept.): Tenasserim (*K. G. Gairdner*). JAVA. SIAM. TONKIN. S. and E. CHINA.

Type in the British Museum.

68. **Copris repertus.** (Plate IX, figs. 7, 8.)

Copris repertus Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208; Lansb., Tijds. Ent. xxix, 1886, p. 11.
Copris claudius Har., Ann. Mus. Civ. Genova, x, 1877, p. 48.

Black and shining, with the antennæ, mouth-organs, and the bristles upon the legs and lower surface reddish.

Broadly oval and highly convex. The *head* is nearly semicircular, with the *clypeus* rugulose, the ocular lobes rugosely punctured, and the vertex between the eyes almost smooth, the clypeus deeply notched in the middle, with a slight lobe on each side of the notch. The *pronotum* is very shining, with a strong longitudinal groove along the middle. The sides are strongly rounded, the front angles truncate, and the hind angles almost obsolete. The *elytra* are lightly striate, except at the base and apex, the striæ minutely punctured, and the intervals flat and very minutely and inconspicuously punctured. The metasternal shield is smooth and the sides of the *metasternum* are moderately closely punctured and sparsely setose. The front tibia is broad and armed with four external teeth, the front femur is rather closely punctured, and the four posterior femora fairly closely upon the outer half. The front tibial spur is nearly straight.

♂. The head bears a slender, feebly curved, slightly compressed erect horn, with a minute tooth behind near the base on each side. The pronotum is almost smooth, except in the front angles, which are rugosely but not strongly punctured. There is a steep anterior declivity, of which the upper edge bears three slight teeth on each side, the four innermost equally spaced and very feeble, the two outer ones

more distant and sharp. In small specimens the two innermost teeth are wanting and the surface immediately behind the edge of the declivity is finely and closely punctured.

♀. The head bears a short, transverse, elevated carina, with the angles slightly produced. The pronotum has a short anterior declivity, of which the upper edge is parallel with the front margin, and it is moderately finely and closely punctured immediately behind the declivity.

Length, 16–22 mm.; breadth, 9–12 mm.

BURMA: Asciuii Gheeu, Karen Hills, 4200–4500 ft. (*L. Fea*, Mar., April). BIHAR: Pusa (*G. P. Pillai*, etc., June, July, Sept., Oct.); Chapra (*Mackenzie*). BOMBAY: Belgaum (*H. E. Andrewes*); Dharwar (*H. Swale*). C. PROV.: Jagdalpur, Bastar State (*E. A. D'Abreu*, Feb.); Nagpur (*E. A. D'Abreu*, Nov.). C. INDIA: Mhow (*E. C. Selous*); Jaithari Range, Umaria, Rewa (*C. F. C. Beeson*, Nov.). S. INDIA: Bangalore; Nilgiri Hills (*H. L. Andrewes*); Pondicherry; Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May); Sappal, Palghat, 1700 ft. (*J. C. M. Gardner*, May); Taliparamba, N. Malabar (*P. S. Nathan*, June). CEYLON: Kelani Valley; Colombo (*W. Braine*); Balangoda, 1776 ft. (*G. Lewis*, Mar.); Suduganga, Matalo (*R. Senior-White*, April).

Type in the British Museum; that of *claudius* in the Genoa Museum.

69. **Copris delicatus**, sp. n.

Black and shining, with the *antennæ*, *mouth-organs*, and scanty hairs upon the legs red.

Oblong-oval and very convex. The *clypeus* is rather broadly but not deeply excised in the middle and is smooth, except for a few scattered punctures on each side, the ocular lobes are strongly but not closely punctured, and the vertex of the *head* is finely but rather sparsely punctured. The *pronotum* bears a deep median groove and is strongly and closely punctured, except close to the groove, where the punctures are fine. The front angles are distinct but blunt, the lateral margins are feebly constricted before the middle and rounded behind, and the hind angles are obsolete. The *elytra* are deeply striate, the striæ are strongly and closely punctured, the intervals strongly convex and very minutely and sparsely punctured. The *pygidium* is strongly and evenly punctured. The metasternal shield has a deep pit and a few coarse punctures in front and is nearly smooth behind, with a median groove, and the sides of the *metasternum* are strongly and moderately closely punctured. The femora are rather closely punctured and the front tibia is armed with four external teeth.

♂. The head bears a long and slender, rather compressed horn. The pronotum is steep in front and unequally, not very

strongly, punctured, and the top of the declivity is straight and not toothed. There is a very feeble blunt prominence on each side, midway between the latter and the outer margin.

♀. The head bears a small blunt tubercle, the clypeus is very faintly punctured and not quite smooth in the middle, and the pronotum slopes, but not abruptly, at the front margin, where it is closely punctured.

Length, 11 mm.; breadth, 5·5 mm.

ASSAM: Mishmi Hills, 2000 feet (*F. Kingdon Ward*, March). BENGAL: Lopchu, Darjeeling Dist., 5000 feet (*J. C. M. Gardner*, Sept.).

Type in the British Museum.

I have seen only a single male from the Mishmi Hills and a single female from Lopchu. Their specific identity seems almost certain.

70. **Copris corpulentus.** (Plate X, figs. 12, 13.)

Copris corpulentus Gillet,* Notes Leyd. Mus. xxxii, 1910, p. 13.

Shining black, with the antennæ, the mouth-organs, and scanty bristles upon the legs, red.

Elongate-oval and moderately convex. The *head* is very smooth, entirely unpunctured, except for a very few punctures near the hind margin of the ocular lobe. The clypeal margin is notched in the middle and feebly bilobed, and there is a sharp-pointed horn, curving backward, in the middle of the head. The *pronotum* is rather smooth, with a finely punctured median groove, narrow behind and broadly dilated in front, and the anterior angles are rather strongly punctured. The front margin is steep, and on each side of the median groove the top of the declivity forms a slight blunt prominence. The lateral margins are strongly and evenly rounded, the front angles obtuse and the hind angles obsolete. The *elytra* are deeply striate, with fine and not very distinct punctures in the striæ, and the intervals are slightly convex and very minutely and sparsely punctured. The *pygidium* is rather strongly and closely punctured. The metasternal shield is very smooth, and the sides of the *metasternum* are not very strongly nor closely punctured. The front tibia is broad and armed with four teeth, and the middle and hind tibiæ are trilobed at the end. The front femur is rather closely punctured and the middle and hind femora are smooth except at the extremity.

♂. The thoracic prominences are simply conical.

♀. The thoracic prominences are flattened in front, a little dilated laterally, and sharply delimited behind by an impressed line, which is almost continuous, the dividing depression being shallower than in the male and rather rugosely punctured.

Length, 20–23·5 mm.; breadth, 12–13 mm.

Assam : Patkai Hills (*W. Doherty*). Burma : Ruby Mines (*W. Doherty*) : Asciuii Gheeu, Karen Hills, 4200–4500 feet. (*L. Fea*, Feb., Mar., April). Asciuii Cheba, 3600–3900 feet (*L. Fea*, Dec., Jan.) : Pakokku Hill Tracts, 6500 feet. (*B. Fischer*, June). Tonkin.

Type in the Genoa Museum ; co-type in Dr. J. J. Gillet's collection.

71. **Copris doriæ.**

Copris doriæ Har.,* Ann. Mus. Genova, x, 1877, p. 49.
Copris consobrinus Lansb.,* Tijds. Ent. xxix, 1886, p. 22, note.
Copris vitalisi Gill.,* Ann. Soc. Sci. Brux. 1921, p. 124 (new syn.).

Black and shining, with the antennæ, the mouth-organs, and scanty bristles upon the legs red.

Oval and moderately convex. The *head* is broad and sparsely but distinctly punctured, the punctures very few upon the clypeus and fairly numerous between the eyes. The front margin of the *clypeus* is sharply notched in the middle and produced into a blunt lobe on each side of the notch. The *pronotum* is gently convex, with the sides rather strongly punctured and the median part almost smooth, with a feeble longitudinal groove or chain of punctures upon its posterior half. The lateral margins are gently curved, the front angles bluntly produced, and the hind angles distinct but obtuse. The *elytra* are deeply striate, the striæ distinctly punctured, and the intervals slightly convex and minutely and sparsely punctured. The *pygidium* is strongly but not at all closely punctured. The front angles of the *prothorax* are rather deeply hollowed beneath. The *metasternum* is strongly punctured at the sides and upon the front part of the shield, the hinder part of which is smooth and deeply grooved along the middle. The front femur and the outer half of the middle and hind femora are fairly closely punctured. The front tibia is broad and armed with four external teeth, the terminal one rather slender, the middle and hind tibiæ are trilobed at the extremity beneath and the tarsi are rather narrow, with the basal joint not distinctly triangular.

♂. The head bears a short, but slender, recurved horn in the middle. The pronotum is rather more strongly convex than that of the female, and sometimes shows a slight flattening in the middle of its front part.

♀. The head bears a stout conical tubercle in the middle.

Length, 10–12·5 mm. ; breadth, 6–7·5 mm.

Assam : Manipur (*W. Doherty*) ; Patkai Hills (*W. Doherty*). Burma : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.) ; Tavoy (*W. Doherty*). Indo-China. Malay Peninsula.* Sumatra. Borneo.

Type in the Genoa Museum, that of *consobrinus* Lansb. in the Brussels Museum, and that of *vitalisi* in Dr. J. J. Gillet's collection.

The short horn of the male is extremely narrow. The described male of *vitalisi* Gill. is evidently a poorly developed specimen, not distinguishable from the female externally.

72. Copris reflexus.

Scarabæus reflexus F., Mant. Ins. i, 1787, p. 16.
Scarabæus oryctes Herbst, Nat. Käf. ii, 1789, p. 215, pl. 14, fig. 14 : Lansb., Tijds. Ent. xxix, 1886, p. 22.

Black and shining, with a light coppery or greenish metallic lustre, and with the antennæ, mouth-organs, and scanty hairs upon the legs, red.

Small, oval, moderately convex. The *head* bears a very slight transverse carina between the eyes, with a conical tubercle upon the middle. It is fairly closely punctured behind the carina and finely and sparsely in front of it. The front margin is deeply notched in the middle, with a rounded lobe on each side of the notch. The *pronotum* is rather strongly and evenly punctured except in the middle, where the punctures are a little finer, and there is a light median groove, containing a chain of punctures, upon the posterior half. The sides are straight in the middle, gently rounded in front and behind, with the front angles bluntly pointed and the hind angles very obtuse. The *elytra* are deeply striate, the striæ rather strongly punctured and the intervals slightly convex and scarcely punctured. The *pygidium* is strongly but not very closely punctured. The metasternal shield is strongly punctured in front and smooth behind, with a posterior median groove, and the sides of the *metasternum* are very strongly but not very closely punctured. The front angles of the prothorax are deeply excavated beneath. The femora bear scattered punctures. The front tibia is broad and armed with four teeth, the terminal one rather slender; the middle and hind tibiæ are trilobed at the extremity beneath and the tarsi are rather slender, with the basal joints not very strongly dilated behind.

The two sexes are alike externally.

Length, 8–10 mm. ; breadth, 5–6 mm.

BURMA: Rangoon (*L. Fea*); Zinba Valley (*R. N. Parker*, Nov.); Karin Hills, Asciuii Ghecu, 4200–4500 ft. (*L. Fea*, March, April); Toungoo (*L. Fea*, Oct.); Ruby Mines (*W. Doherty*); Kawkareik (*L. Fea*, Jan., Feb.); Meetan (*L. Fea*, April); Tavoy (*W. Doherty*). CHINA. MALAY PENINSULA. JAVA. BORNEO.

The *type* is missing from the Banks Collection, now in the British Museum, in which it is stated to have been. This specimen is said to have been Chinese. Lansberge regarded

Scarabæus oryctes Herbst as a Malayan species distinct from *S. reflexus* F., but Dr. Kuntzen informs me that Herbst's specimen, or specimens, the habitat of which was unrecorded, for Herbst believed them to inhabit Germany and the Netherlands, are also irretrievably lost. *C. reflexus* certainly forms local races, but there is no reason for attributing *oryctes* to any one of these. Bornean specimens are distinguished by acute clypeal processes, and Lansberge appears to have associated examples of the Bornean and Javan races as the two sexes of his *C. oryctes*, believing the acute clypeal processes to be distinctive of the female sex.

73. **Copris numa.** (Plate X, fig. 14.)

Copris numa Lansb., Tijds. Ent. xxix. 1886, p. 19.

Black and shining, with the antennæ, mouth-organs, and bristles upon the legs red.

Rather narrowly oval and moderately convex. The *head* is broad and very smooth, with a few fine punctures between the eyes and upon the hinder part of the ocular lobes. The front margin of the *clypeus* is very feebly excised in the middle, and there is a very short conical process just in front of the eyes. The *pronotum* is rather smooth, with a slight median groove extending from the basal groove to just in front of the middle, the front angles and a narrow lateral border on each side closely and fairly strongly punctured, and a few minute punctures on each side of the middle. The lateral margins are evenly rounded, the front angles truncate, and the hind angles obsolete. The *elytra* are deeply striate, the striæ lightly and minutely punctured, and the intervals rather convex and very smooth. The *pygidium* is rather finely and closely punctured. The metasternal shield is very smooth and the sides of the *metasternum* are strongly punctured. The front tibia is broad and armed with four external teeth, and the middle and hind tibiæ are trilobed at the extremity. The front femora are strongly, and the middle and hind femora very feebly, punctured.

♂. The anterior part of the pronotum is entirely smooth and gently rounded, with a faint indication of a longitudinal impression in the middle. The terminal spur of the front tibia is blunt and slightly spatulate.

♀. There is a short, transverse, nearly straight or very feebly sinuous ridge parallel to the front margin of the pronotum, and at the top of the anterior declivity and immediately behind this ridge the surface is very finely punctured for a short distance. The terminal spur of the front tibia is pointed.

Length, 19–21 mm.; breadth, 10·5–12 mm.

ASSAM : Mishmi Hills, 2000 ft. (*Capt. Kingdon Ward*, March). BURMA : Tavoy (*W. Doherty*). MALAY PENINSULA. SUMATRA. BORNEO.

Type in the Leyden Museum : co-type in the Genoa Museum.

74. Copris confucius.

Copris confucius Har., Ann. Mus. Civ. Genova, x, 1877, p. 48 (note).

Black and shining, with the antennæ, mouth-organs, and scanty bristles upon the legs red.

Oval and convex. The *head* is broad and very smooth, with fine punctures between the eyes and a few upon the posterior part of the ocular lobes. The front margin of the *clypeus* is reflexed, sharply notched in the middle, and bluntly lobed on each side of the notch. The *pronotum* is moderately finely and closely punctured, except in its basal part and the middle of the front margin, and has an imperfect longitudinal groove extending from the base to behind the middle. The sides are strongly rounded, the front angles form broad rounded lobes, and the hind angles are entirely obsolete. The *elytra* are deeply striate, the striæ are scarcely perceptibly punctured, and the intervals are almost flat and very smooth and shining. The *pygidium* is fairly strongly and closely punctured. The metasternal shield is very smooth, with a few scattered punctures at its anterior end, and the sides of the *metasternum* are shining and not very closely or strongly punctured. The front tibia is broad and armed with four external teeth, and the middle and hind tibiæ are trilobed at the end. The front femur is strongly punctured, and the middle and hind femora are smooth upon the basal half.

♂. The pronotum is evenly rounded, without trace of carina or declivity.

♀. The pronotum has a slight anterior declivity, with a fairly well-defined upper margin, which forms the anterior limit of the discoidal puncturation.

Length, 14–18 mm. ; breadth, 7–10 mm.

BURMA : Palon, Pegu (*L. Fea*, Aug., Sept.). INDO-CHINA. SIAM. S. CHINA.

Type ? in M. René Oberthür's collection.

75. Copris bengalensis.

Copris bengalensis Gillet,* Ann. Soc. Ent. Belg. lv, 1911, p. 289.

Shining black or pitchy-black, with the antennæ, the mouth-organs, and the bristles upon the legs red.

Oval, not very broad, fairly convex. The *head* is broadly semicircular and very smooth and shining, but with crowded punctures between the eyes and a few large punctures upon

the posterior part of the ocular lobes. The *head* bears a short conical horn in line with the front margins of the eyes, and the front margin of the *clypeus* is feebly bilobed in the middle. The *pronotum* is strongly and closely punctured, with a narrow, punctured, median groove posteriorly, a smooth area on each side of the groove near the base, and a slight smooth, transverse elevation on each side of the middle behind the front margin. The lateral margins are well rounded, the front angles fairly sharp, and the hind angles almost obsolete. The *elytra* are deeply striate, the striæ finely punctured and the intervals convex and scarcely perceptibly punctured. The *pygidium* is coarsely and very closely punctured. The metasternal shield is smooth, with a few punctures in front, and the sides of the *metasternum* are fairly strongly and closely punctured. The front tibia is broad and armed with four external teeth, the front femora are closely punctured, and the four posterior femora closely upon the outer half.

♂. The horn is sharp-pointed and curved a little backward. The smooth anterior elevations of the pronotum are ill defined.

♀. The horn is short and blunt, and the prothoracic elevations are narrow and form an almost continuous curved ridge.

Length, 17–18 mm. ; breadth, 9·5 mm.

BURMA : Cheba, Karen Hills, 1500–3000 ft. (*L. Fea*, Dec.) ; Cauri, Kachin Hills (*L. Fea*, Aug., Nov.).

Type in the Hope Dept., Oxford Museum.

The two specimens originally described were of unknown origin and uncertain sex, but I have found in the Genoa Museum Collection a male and female agreeing with them, and taken in the localities cited above.

76. Copris compressipennis.

Copris compressipennis Gillet,* Notes Leyd. Mus. xxxii, 1910, p. 14.

Black and shining, with the antennæ, mouth-organs, and scanty bristles upon the legs red.

Oblong and not very convex. The *head* is short and broad, strongly and unevenly punctured behind, with the *clypeus* smooth, shining, and unpunctured and its front margin very feebly notched in the middle. The *pronotum* has a deep, irregularly punctured, median groove, and is unevenly punctured, the punctures very fine on each side of the groove and large and subrugose at the sides. The lateral margins are nearly straight and parallel in the middle, obliquely convergent in front, with the front angles obtuse and the hind angles broadly rounded. The *elytra* have each a large shallow, lateral depression behind the middle, and are strongly but not deeply sulcate, with the intervals a little rounded and fairly closely but unevenly punctured, except in the anterior

dorsal region. The *pygidium* is closely and strongly punctured. The metasternal shield is smooth and unpunctured, and the sides of the *metasternum* are strongly but not very closely punctured, without hairy clothing. The front tibia bears four sharp teeth, and the middle and hind tibiæ are trilobed at the end. The front femora are closely and strongly punctured, and the middle and hind femora are punctured upon the outer half.

♂. The clypeus is almost straight in front, and there is a short, slender, erect horn in the middle, immediately behind the margin. Just behind the horn there is another short but sharp process directed obliquely forward.

♀. The clypeus is bluntly toothed on each side of the broad emargination, and a short conical tubercle rises from the middle of the head a little in front of the eyes.

Length, 13·5–16 mm. ; breadth, 8–9 mm.

SIKKIM : Darjeeling (*Verschraeghen*). ASSAM : Manipur (*W. Doherty*).

Type in Dr. J. J. Gillet's collection.

77. **Copris imitans.** (Plate X, fig. 3.)

Copris imitans Felsche,* Deutsche Ent. Zeits. 1910, p. 347.

Black and shining, with the antennæ, mouth-organs, and the bristles clothing the legs, reddish.

Broadly oval and convex. The *head* is very smooth and shining, with a few punctures upon the vertex and ocular lobes. The clypeal margin is reflexed, a little emarginate in front, and produced upwards in the middle of the emargination as a short erect process. Another similar process, inclined a little backwards, arises behind the first and a little in front of the eyes. The *pronotum* is rather finely and evenly and fairly closely, but not densely, punctured, and has a conspicuous marginal membrane in the anterior emargination and a row of large, oval, annular impressions at the base. The lateral margins are strongly rounded, the front angles very obtuse, and the hind angles obsolete. The *elytra* are deeply striate, the striæ finely and closely and not conspicuously punctured, the intervals convex, with minute, rather scattered punctures. Each elytron has a small vertical flattening near the extremity. The *pygidium* is strongly punctured. The metasternal shield is very smooth and shining, with fine scattered punctures in the anterior part, and the sides of the *metasternum* are fairly strongly and not closely punctured. The front tibiæ are broad and armed with four sharp teeth, and the front femora are rather closely punctured.

♂. The anterior clypeal process is flat, the pronotum is very convex, without a distinct longitudinal groove, and with

a narrow marginal membrane, and the front femur has two teeth, the inner one blunt and the outer rather sharp, upon the anterior edge.

♀. The anterior clypeal process is carinate behind and triangular in section at the base, the pronotum has a longitudinal median groove in its posterior half and is not very convex, the anterior emargination is more or less angulate in the middle and the marginal membrane broad.

Length, 13–15 mm. ; breadth, 7–8 mm.

C. PROV. : Motinala R., S. Mandla (*N. C. Chatterjee*, June) ; Korai, Seoni District, 2000 ft. (*E. A. D'Abreu*, Oct.) ; Supkhar, 2629 ft., Balaghat District (*E. A. D'Abreu*, Jan.). C. INDIA : Amarkantak, Umaria, Rewa, 3200 ft. (*C. F. C. Beeson*, Nov.) ; Pharisamer Hills, Rewa (*H. S. Pruthi*, Feb.) ; Mhow. GOA : Mormugao (*S. Kemp*, Sept.). BOMBAY : Dandeli, N. Kanara (*B. M. Bhatia*, Nov.) ; Bhagwati, N. Kanara (*B. M. Bhatia*, Nov.) ; Tavargatti, Belgaum (*B. M. Bhatia*, Oct.) ; Tansa, E. Thana (*C. F. C. Beeson*, Oct.).

Type in the Dresden Museum.

78. **Copris excisus.**

Copris excisus Wat.,* Ann. Mag. Nat. Hist. (6) vii, 1891, p. 521.

Black and moderately shining, with the head and lower surface very smooth and glossy, the antennæ, mouth-organs, and the hairy clothing of the legs reddish.

Elongate-oval and not very convex. The *head* is very smooth and shining in front, moderately punctured behind, with a median tubercle and a transverse excavation between the eyes. The *pronotum* is evenly and fairly closely punctured, the punctures fine in front but becoming stronger towards the base, which has a row of large, annular, oval impressions. There is a broad marginal membrane in the anterior emargination. The lateral margins are gently rounded, the front angles slightly, and the hind angles very, obtuse. The *elytra* are rather deeply striate, with fine and fairly close punctures in the striæ, the intervals slightly convex and finely but not closely punctnred. The *pygidium* is strongly and fairly closely punctured. The metasternal shield is very smooth, with a few scattered punctures in front, and the sides of the *metasternum* are sparingly and fairly strongly punctured. The femora are well punctured and the front tibia is armed with four sharp teeth.

♂. The head bears a minute conical tubercle in the middle, and the clypeus is deeply incised on each side, forming a pair of short but rather slender lateral processes, directed outward, and curving slightly upward. The front margin of the head is almost straight.

♀. The clypeus is bluntly bidentate in front. The median tubercle is stronger than in the male and the posterior excavation is deeper.

Length, 11–12 mm. : breadth, 6–7 mm.

PUNJAB : Gharial, Murree Hills, 6000 ft. (*H. S. Pruthi*, Sept.).

Type in the British Museum.

The actual habitat of the pair first described is unknown. They bear only the words "India borealis" in Reiche's handwriting. Waterhouse, in his description, says : "the female is altogether more shining than the male," but this is probably only an accidental condition.

79. **Copris punctulatus.** (Plate X, figs. 8, 9.)

Copris punctulatus Wied.,* Zool. Mag. ii, 1, 1823, p. 11 ; Lansb., Tijds. Ent. xxix, 1886, p. 21.

Black, reddish- or greyish-black, not very shining, with the exception of the head ; the antennæ, mouth-organs, and hairy clothing of the legs red.

Oval and not very convex. The *head* is very smooth and shining, with its anterior margin entire and strongly reflexed, especially in the middle. There are a few punctures in the neighbourhood of the eyes. The *pronotum* is moderately, not densely, punctured, and has a broad marginal membrane in the anterior emargination. There is a slight, but strongly and closely punctured, median longitudinal groove not extending to the front margin, and a feebly punctured anterior area on each side of the middle line. The lateral margins are strongly rounded, the front angles form prominent rounded lobes, and the hind angles are obsolete. The *elytra* are strongly striate, the striæ finely and closely punctured, the intervals flat and well, but not densely, punctured. Each elytron has a rather abrupt vertical flattening near the extremity. The *pygidium* is moderately closely punctured. The metasternal shield is very smooth and bears a narrow median groove, and the sides of the *metasternum* are rather evenly, not very strongly or closely, punctured. The front tibia is broad and armed with four external teeth, and the front femur is rather strongly punctured.

♂. The clypeal margin is produced upward in the middle as a short narrow process bilobed at the extremity, and there is a slight conical tubercle in the middle of the head. The front margin of the pronotum is not produced in the middle.

♀. The clypeal margin is not produced in the middle. There is a slightly curved transverse carina between the clypeus and forehead and a triangular process directed backward between the eyes, the carina and process enclosing a flat space

which bears a few extremely fine punctures. The front margin of the pronotum forms a slight rounded lobe in the middle.

Length, 12–17·5 mm. ; breadth, 7–9 mm.

ASSAM : Patkai Hills (*W. Doherty*). BURMA : Palon, Pegu (*L. Fea*, Aug., Sept.) ; Tharrawaddy (*G. Q. Corbett*) ; Kawkareik (*L. Fea*, Jan., Feb.). INDO-CHINA. MALAY PENINSULA. JAVA. CELEBES.

Type in the Hamburg Museum.

80. **Copris andrewesi.**

Copris andrewesi Wat.,* Ann. Mag. Nat. Hist. (6) vii, 1891, p. 521.

Black, not shining, except the head and lower surface, with the antennæ, mouth-organs, and scanty hairs upon the legs red.

Oval and moderately convex. The *head* is very shining, strongly punctured behind and at the sides, and almost smooth in the middle of the clypeus. The front margin of the latter is strongly reflexed and produced in the middle into a rounded lobe. The *pronotum* is strongly, evenly, and densely punctured, the sides are gently rounded, the front angles form rounded lobes, and the hind angles are entirely obsolete. There is a broad marginal membrane in the anterior emargination. The *elytra* are deeply sulcate, the sulci finely punctured, and the intervals strongly convex and entirely opaque. Each elytron has an oblique vertical flattening at the extremity. The *pygidium* is strongly and rather closely punctured. The metasternal shield bears a few scattered punctures in front and a feeble longitudinal groove behind, and the sides of the *metasternum* are strongly but rather sparingly punctured. The femora bear scattered punctures, the front tibia is armed with four external teeth, and the middle and hind tibiæ are trilobed at the end.

♂. There is a short longitudinal elevation between the eyes, and a similar but more rectangular transverse elevation a short distance in front of it. The spur of the front tibia is broad and blunt at the end.

♀. There is a short conical tubercle in the middle of the forehead, and in line with the front margin of the eye. The spur of the front tibia is pointed.

Length, 11·5–15·5 mm. ; breadth, 6–7·5 mm.

BOMBAY : Belgaum (*H. E. Andrewes*) ; Dharwar (*H. Swale*) ; N. Kanara (*T. R. D. Bell*). BENGAL : Berhampore (*E. T. Atkinson*). C. PROV. : Nagpur, 1000 ft. (*E. A. D'Abreu*, June, July) ; Korai, Seoni District, 2000 ft. (*E. A. D'Abreu*, Oct.) ; Motinala R., S. Mandla (*N. C. Chatterjee*, June). C. INDIA : Mhow (*E. C. Selous*). MYSORE : Bhadravati, Shimoga District (*H. S. Rao*, Dec.) ; Bangalore (*T. H. L. Grosvenor*, June).

Type in the British Museum.

81. **Copris punjabensis.**

Copris punjabensis Gillet,* Ann. Soc. Sci. Brux. 1921, p. 126.

Entirely black and opaque above, with the antennæ, mouth-organs, and bristles upon the legs red.

Moderately elongate and depressed. The *head* is rather finely and closely punctured, with the *clypeus* a little smoother and shining in front and its anterior margin strongly reflexed and produced in the middle into a rounded tongue-like lobe. There is a rather deep depression between the eyes. The *pronotum* is finely and very deeply punctured, without a distinct median groove, the lateral margins are evenly and gently rounded, the front angles broadly rounded and the hind angles obsolete. The *elytra* are deeply sulcate, with the intervals convex and finely but not closely punctured. The *pygidium* is strongly and closely punctured. The metasternal shield is rather finely and evenly punctured in front and smooth behind, with a median groove and a row of punctures close to the hind margin, and the sides of the *metasternum* are evenly and rather more strongly punctured. The front tibia is broad and armed with four teeth, and the front femur and the outer part of the middle and hind femora are rather closely punctured.

♂. The head bears in the middle a slight longitudinal elevation, of a rather triangular shape, with the pointed end behind.

♀. The head has a feeble rounded elevation in the middle.

Length, 12–13 mm.; breadth, 6·5–7 mm.

PUNJAB: Kalka (*G. Babault*, Sept.).

Type in Dr. J. J. Gillet's collection.

82. **Copris ramosiceps.** (Plate X, fig. 1.)

Copris ramosiceps Gillet,* Ann. Soc. Sci. Brux. 1921, p. 126.

Black and opaque, with the antennæ, mouth-organs, and scanty bristles upon the legs red.

Broadly oval and not very convex.

♂. The *head* is coarsely and closely punctured, with the *clypeus* deeply and roundly excised on each side in line with the eyes, the outer angle of the excision projecting rather sharply and the median part of the clypeus rounded and produced upward in the middle of its anterior margin as a slender horn, which bifurcates widely at a short distance from the base, the two branches curving upward and backward, and each bearing a rounded lobe anteriorly near the middle. From the base of the horn a slight carina extends backward to beyond the middle of the clypeus. The horn bears short and rather scanty bristles. The *pronotum* is short, moderately convex, and closely punctured. The

front angles form very broad lobes, the sides are unevenly rounded, contracting behind, and the hind angles are distinct but obtuse. The *elytra* are faintly striate, the striæ finely punctured, the intervals nearly flat, opaque, and minutely but not sparsely punctured. The *pygidium* is strongly and closely punctured. The metasternal shield is rather strongly punctured, except along the middle, where it is finely grooved, and the sides of the *metasternum* are coarsely punctured. The front angles of the prothorax are strongly punctured beneath, and not hollowed. The front tibia is broad, with a bisinuate inner edge, and armed with four rather short, sharp, external teeth. All the femora are closely punctured.

The female is unknown.

Length, 13 mm.; breadth, 7 mm.

Type in Dr. J. J. Gillet's collection.

Only a single example of this curious species is known, and this has been kindly lent to me by Dr. Gillet. Its origin is unknown, but as most of the forms to which it is related are Indian, it is very likely that this will also be found to be a member of the same fauna.

83. **Copris cribratus.**

Copris cribratus Gillet,* Ann. Soc. Ent. Belg. lxvii, 1927, p. 253.

Chocolate-brown, with the elytra, legs, and lower surface more reddish than the remainder. The body is strongly punctured above and beneath and has very minute pale setæ in the punctures, but is otherwise without clothing, except upon the legs. It is rather elongate and depressed. The *head* is strongly but not densely punctured, shining, with the anterior part narrowly smooth and the front margin strongly bidentate. The *pronotum* is strongly and densely punctured and opaque, the sides are unevenly rounded, the front angles broadly rounded and prominent, and the hind angles almost obsolete. The *elytra* are finely striate, with the dorsal intervals flat and the lateral ones slightly convex, all strongly and rather closely punctured, but less closely along the middle of some of the lateral intervals. The *pygidium* is coarsely and closely punctured. The metasternal shield is sparingly but rather evenly punctured, the sides of the *metasternum* a little more closely and the femora rather closely. The front tibiæ are rather broad and armed with four sharp external teeth.

Length, 13 mm.; breadth, 7 mm.

S. India : Kalyana Pandal, Anaimalai Hills, 3000 ft.

Taken in elephant-dung.

Type in Dr. J. J. Gillet's collection.

I have seen only two similar specimens, which appear to be males.

84. Copris furciceps.

Copris furciceps Felsche,* Deutsche Ent. Zeitschr. 1910, p. 348.

Chocolate-brown or chocolate-black, opaque, with the head and lower surface shining, the antennæ, mouth-organs, and bristles upon the legs, red or yellow.

Oval and not very convex. The *head* is very smooth and shining in front, strongly and closely punctured behind. The *pronotum* is very densely and subrugosely punctured, with a broad marginal membrane in the anterior emargination. The lateral margins are gently rounded, the front angles blunt and the hind angles obsolete. The *elytra* are lightly striate, with close punctures adjacent to the striæ and rendering them indistinct, and the intervals are slightly raised and closely but unevenly punctured. The *pygidium* is coarsely and rather closely punctured. The metasternal shield is well punctured, except along the middle line of the anterior part, and the sides of the *metasternum* are rather more closely and coarsely punctured. The front tibia is armed with four sharp teeth, and all the femora are fairly closely punctured.

♂ (typical phase). The clypeus is excised in the middle of the front margin and sharply toothed on each side of the excision, the margin of which is produced obliquely upward and backward as a short pointed horn. Behind this, and in line with the front margins of the eyes, is a second short horn, also produced obliquely backward but blunt at the tip. The front margin of the pronotum is notched in the middle.

♂ (var.). The clypeal margin is not distinctly bidentate, but is produced in the middle into a comparatively long and strongly curved horn, which is a little hollowed in front and bears a minute tooth on each side a little above the base.

♀. The clypeus is rather strongly bilobed in the middle of the front margin, and bears behind a slightly elevated, transverse, bicuspidate tubercle. The front margin of the pronotum is gently rounded in the middle and not notched.

Length, 9–12·5 mm. ; breadth, 4·5–6·5 mm.

ASSAM : Tura, Garo Hills, 1200–1500 ft. (*S. Kemp*, June, July) ; Patkai Hills (*W. Doherty*). BURMA : Palon, Pegu Div. (*L. Fea*, Aug., Sept.) ; Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.) ; Tavoy (*W. Doherty*).

Type in the Genoa Museum ; co-type in the British Museum.

This species has a very close resemblance to the South Indian *C. davisoni* Wat., but the head is much less smooth and shining, only the anterior part of the clypeus being free from punctures, the elytra are less distinctly striate, and the metasternum is much more strongly punctured. The armature of the head is practically the same as in *C. davisoni*, but the phase of the male corresponding to the normal form

in that species appears to be exceptional in *C. furciceps*, as the fairly numerous series examined includes only one example. In a very small male the head is destitute of any trace of horn.

85. **Copris signatus.** (Plate X, figs. 10, 11.)

Copris signatus Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208; Wat., *op. cit.* (6) vii, 1891, p. 520.

Black and opaque, with the head and the lower surface smooth and shining, the antennæ, mouth-organs, and scanty bristles on the legs, red or yellow.

Oval and not very convex. The *clypeus* is smooth and shining, the forehead between the eyes and the ocular lobes bear moderately strong punctures. The *pronotum* is densely punctured, with a broad marginal membrane in the anterior emargination. The lateral margins are strongly rounded, the front angles entirely rounded, and the hind angles obsolete. The *elytra* are strongly striate and the intervals convex and closely punctured. The *pygidium* is rather strongly and closely punctured. The metasternal shield is very smooth and shining, with a very few scattered punctures anteriorly, and the sides of the *metasternum* bear large, not close, punctures. The front tibia is broad and armed with four sharp teeth, the front femur is rather closely punctured, and the middle and hind femora are punctured in their outer part only.

♂. The front margin of the clypeus has a pair of narrow erect processes, nearly parallel or slightly approaching one another at the tips. They bear scattered hairs along their inner and outer edges. Just before the eyes the head bears a median, transverse, erect T-shaped process, its shaft short and broad, and the arms rather long and pointed. In small males the clypeal processes are closer together and very short.

♀. The clypeal margin is rather strongly bilobed in the middle, and the head bears a slight conical projection in front of the eyes.

Length, 10–15 mm.; breadth, 6–8·5 mm.

C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, Sept., Oct.). S. INDIA: Bolampatty, Coimbatore (*P. V. Isaac*, Dec.); Bangalore (*T. H. L. Grosvenor*, June); Mahé, Malabar; Travancore. CEYLON: Peradeniya (*E. E. Green*, Dec.); Suduganga, Matale (*R. Senior-White*, April); Vavuniya, N. Prov. (*G. M. Henry*, Dec.); Koggala (*G. M. Henry*, Nov.); Madulsima (*G. M. Henry*, Nov.); Haldummulla (*G. M. Henry*, June); Kotte (*G. M. Henry*, Oct.); Urugala (*G. M. Henry*, April); Balangoda (*G. M. Henry*, April).

Type in the British Museum.

86. **Copris surdus**, sp. n.

Black, opaque above, with the head, lower surface, and legs shining, the antennæ, mouth-organs, and scanty bristles upon the legs reddish.

Elongate-oval, not very convex. The *clypeus* is bidentate in front, smooth in the middle, lightly punctured at the sides, the ocular lobes are strongly punctured, there is a deep transverse depression at the back of the head and a short horn or conical elevation immediately in front of it. The *pronotum is finely and closely punctured, with a broad marginal* membrane in the anterior emargination and a very feeble posterior longitudinal groove. The front angles are truncate and the hind angles very obtuse. The *elytra* are finely striate, the intervals almost flat and finely and very densely punctured. The *pygidium* is strongly and closely punctured. The *mesosternum* is finely and densely punctured, the metasternal shield is smooth, with a few scattered punctures in front and behind, and the sides of the *metasternum* are strongly punctured.

♂. The marginal teeth of the clypeus are strong, sharp, and triangular, and reflexed at right angles to the clypeus. The cephalic horn is short but very slender and blunt at the tip. The pronotum is a little more convex that that of the female, and its front margin is sharply angular in the middle.

♀. The marginal teeth of the clypeus are blunt, and the head bears a slight conical elevation in the middle.

Length, 12–14 mm. ; breadth, 6·5–7·5 mm.

U. Prov. : Chakrata, Haldwani (*B. M. Bhatia*, May) ; Tanakpur, Kumaon (*H. G. Champion*).

Type in the British Museum.

87. **Copris davisoni.** (Plate X, figs. 6, 7.)

Copris davisoni Wat.,* Ann. Mag. Nat. Hist. (6) vii, 1891, p. 520.

Black and opaque, with the head and lower surface smooth and shining, the antennæ, mouth-organs, and scanty bristles upon the legs red or yellow.

Oval and very convex. The *head* is very smooth and shining, but with punctures in the neighbourhood of the eyes. The *pronotum* is very densely punctured, with a broad marginal membrane in the anterior emargination. The lateral margins are gently rounded, the front angles blunt, and the hind angles obsolete. The *elytra* are distinctly striate, with well marked transverse punctures contiguous to the striæ, the intervals rounded, and rather closely and evenly punctured. The *pygidium* is strongly and fairly closely punctured. The metasternal shield is very smooth, with only a few punctures near the margins, and the sides of the *metasternum* bear

rather scattered punctures. The front tibiæ are broad and armed with four sharp teeth, the front femora are closely punctured, and the four posterior femora are rather smooth upon the basal half.

♂. The front margin of the clypeus is produced upward in the middle, forming a backwardly curved pointed horn a little hollowed in front. Behind this, and just in front of the eyes, is a second horn, short, rather stout, blunt at the tip, and also directed obliquely backward. The front margin of the pronotum is notched in the middle.

In males of feeble development the clypeus is excised in the middle of the front margin and sharply toothed on each side of the excision, the margin of which is produced obliquely backward into a very short horn, behind which is a second rather stouter process.

♀. The clypeus is rather strongly bilobed in the middle of the front margin and bears a very short conical tubercle behind. The front margin of the pronotum is gently rounded in the middle and not excised.

Length, 10–14 mm. ; breadth, 5·5–8 mm.

BOMBAY : Hattikeri, S. Kanara (*B. M. Bhatia*, Nov.). S. INDIA : Nilgiri Hills (*H. L. Andrewes*) ; Palni Hills, 5000 ft. (*S. Kemp*, Sept.) ; Peermade, Travancore (*Amirdam*, Sept.).

Type in the British Museum.

88. **Copris anomiopseoides.** (Plate X, fig. 2.)

Copris anomiopseoides Bouc.,* *Bull. Soc. Ent. France*, 1924, p. 210.

Black and opaque, with the head and lower surface smooth and shining, and the antennæ, mouth-organs, and scanty bristles on the legs reddish-yellow.

Broadly oval and not very convex. The *clypeus* is smooth, with scattered punctures on each side, and the ocular lobes and the space between the eyes are fairly closely punctured. The *pronotum* is rather convex and densely and evenly punctured, and there is a broad marginal membrane in the anterior emargination. The sides are strongly rounded, the front angles very obtusely pointed, and the hind angles almost obsolete. The *elytra* are not very deeply striate, the striæ contain close transverse punctures, and the intervals are slightly rounded and closely and finely punctured. The *pygidium* is strongly and fairly closely punctured. The metasternal shield is smooth, with a few scattered punctures in its anterior part, and the sides of the metasternum are not very strongly or closely punctured. The legs are rather long, the front tibia is broad and armed with four sharp teeth, and the femora are finely punctured, except at the base in the two posterior pairs.

♂. The clypeus is deeply and almost semicircularly excised on each side, the outer part forming a blunt, narrow, lateral lobe, and the median part produced upward and strongly bifurcate, forming a pair of recurved, divergent, narrow horns, fringed with short, scanty hairs along the inner and outer edges. There is a very feeble conical median tubercle just in front of the eyes.

The female is unknown.

Length, 15 mm.; breadth, 8 mm.

BURMA: Thayetmyo. INDO-CHINA.

Type in M. Boucomont's collection.

Genus PHALOPS.

Phalops Er., Nat. Ins. Deutschl. iii, 1848, p. 764; Lacord., Gen. Col. iii, 1856, p. 109; Lansb., Stett. Ent. Zeit. xliv, 1883, p. 162.
Ephillopus Reitt., Verh. Ver. Brünn, xxxi, 1893, p. 168.

TYPE, *Copris divisa*, Wied.

Range. Africa, S.W. Asia, and India.

Body generally rather short and broad, not very convex. Legs of moderate length, the middle and hind tarsi broad and flattened, with the basal joint long and the 2nd, 3rd, and 4th very short and differing little amongst themselves. Ocular lobes of the head very prominent laterally.

♂. Head more strongly dilated before the eyes, the clypeus narrowly produced in front and the posterior part of the head produced backwards as a broad plate cleft in the middle, the two halves generally close together, like those of a pen-nib, sometimes diverging at the tip.

The other features are as in *Onthophagus*. In his original diagnosis of the genus Erichson has described the eyes as completely divided, but this was an error. D'Orbigny, in his great Monograph of the African Onthophagi (Ann. Soc. Ent. France, 1913, p. 50), has regarded *Phalops* as a sub-genus of *Onthophagus*, but it appears to be fairly sharply separated by the peculiar form of the posterior tarsi, besides which the distinctive features of the head in the male are of a very peculiar kind.

Key to the Species of Phalops.

1 (2) Pronotum very shining, punctured behind	*candezei* Lansb., p. 135.
2 (1) Pronotum not very shining, not punctured.	
3 (6) Pronotum entirely granulate.	
4 (5) Elytra not very opaque, maculate	*divisus* Wied., p. 135.
5 (4) Elytra very opaque, speckled	*cyanescens* d'Orb., [p. 136.
6 (3) Pronotum rugose, with granules at the sides only	*clivaceus* Lansb., [p. 137.

89. **Phalops candezei.**

Phalops candezei Lansb.,* Stett. Ent. Zeit. xliv, 1883, p. 165.

Deep metallic green or dark blue, shining above and only scantily clothed with minute yellowish setæ, which are longer at the extremities of the elytra and upon the pygidium, each elytron ornamented with a pale yellow, narrow, lateral border at the middle of the outer margin, but not extending to the epipleura, and generally about one-third of the length of the margin from base to suture, but sometimes a little produced forward.

The *clypeus* is transversely rugose and separated by a sharp carina from the granulate forehead. The sides of the *head* are produced outwards into very broadly rounded lobes. The *pronotum* is granulate at the sides and in front and unevenly punctured in the middle, the front angles are very bluntly produced and minutely hooked externally, the sides are feebly sinuate behind, the hind angles minutely indicated, and the base very feebly rounded. The *elytra* are lightly striate and the intervals rather rugosely punctured. The *pygidium* is minutely and rather feebly punctured. The *metasternum* is feebly punctured at the sides, very minutely in the middle, and more strongly at the sides and base of the shield.

♂. The clypeus is smooth in front and transversely rugose behind, it is produced into a reflexed tongue-like lobe in front, and the posterior part of the head is produced into a broad lamina, which forms two lobes, of which the extremities diverge widely. The front margin of the pronotum is vertical and more or less smooth and shining. The legs are rather longer than those of the female, especially the front tibia, of which the external teeth are feeble, and the extremity is produced into a finger-like process.

♀. The clypeus is feebly bilobed in the middle and the posterior margin of the head is broadly notched. The legs are short and the front tibia broad and strongly toothed.

Length, 11–14 mm. ; breadth, 6·5–8 mm.

Bombay : Belgaum (*H. E. Andrewes*). C. India : Mhow (*Selous*). S. India : Harivanam, Bellary District (Aug.).

Type in the Brussels Museum.

90. **Phalops divisus.** (Plate I, fig. 2.)

Copris divisus Wied.,* Zool. Mag. ii, 1, 1823, p. 12.
Phalops divisus Lansb., Stett. Ent. Zeit. xliv, 1883, p. 169.

Bright metallic green, dark blue or coppery, the elytra usually decorated with yellow markings, which may consist of a more or less triangular patch at the outer edge just behind the middle, and a patch in the sutural angle extending a short distance forward. Additional yellow spots may appear near

the base and near the middle of the suture, and all may unite so that a large part of the surface of the elytra is yellow.

The upper surface is slightly shining and clothed with fine erect yellow setæ. The *clypeus* is transversely rugose and separated by a carina from the forehead, which is granulate. The *pronotum* is fairly closely and evenly covered with fine granules. The front angles are broadly truncate, with a very minute tooth externally, the sides are slightly sinuate behind, the hind angles feebly indicated, and the base very feebly rounded. The *elytra* are deeply striate, with the intervals rather closely and finely, and in parts rugosely, punctured or granular. The *pygidium* is opaque and closely and finely granular or strigose. The *metasternum* is very smooth in the middle, sparingly granulose, punctate at the sides, and more closely at the sides of the shield.

♂. The clypeus is smoother in front than behind, it is produced in the middle into a reflexed tongue-like lobe, the ocular lobes are produced outwards in front of the eyes into blunt subangular processes, and the posterior part of the head is produced backwards into a broad lamina, terminating in two slightly separate but not divergent points. The front margin of the pronotum is vertical and more or less smooth and shining. The legs are longer than those of the female, especially the front tibiæ, of which the external teeth are short and feeble, and the extremity is sharply produced internally.

♀. The clypeus is rounded and feebly bilobed in the middle, the sides are rounded but not produced, and the posterior margin of the head is slightly notched. The legs are short and the front tibia broad and strongly toothed.

Length, 9–13 mm. ; breadth, 5–7·5 mm.

U. Prov. : Sitapur (*H. G. Champion*, July) ; Fyzabad (*W. H. G. Hingston*). C. India : Mhow (*Selous*). S. India : Podanur (*A. K. Weld Downing*) ; Walawanad, Malabar (June) ; Kodumur, Kurnool District (*Ponniah*, Aug.) ; Coimbatore (*M. P. K. Kutty*, June) ; Coromandel (*M. Maindron*). Ceylon : Bintenne (*G. M. Henry*, Oct.).

Type in the Copenhagen Museum.

91. **Phalops cyanescens.**

Onthophagus cyanescens d'Orbigny,* Ann. Soc. Ent. France, lxvi, 1897, p. 243 ; id., l'Abeille, xxix, 1898, p. 221.

Dark blue, opaque above, the elytra with a yellow outer marginal line and numerous irregular yellow spots, or yellow, with a dark sutural line and irregular dark spots and blotches, the upper surface clothed with extremely minute yellow setæ, replaced by short, erect, yellowish hairs upon the extremities of the elytra and the pygidium.

The *clypeus* is rugose and divided by an almost straight carina from the closely granulate forehead. The sides of the *head* are produced into broadly rounded lobes. The *pronotum* is rather finely and closely granular, the front angles are a little produced and bluntly hooked externally, the sides are slightly sinuate in front and behind, and the base is feebly rounded. The *elytra* are finely striate and the intervals minutely granulate. The *pygidium* is minutely and rather sparsely granular. The *metasternum* is irregularly but distinctly punctured in the middle and rather strongly at the sides.

♂. The clypeus is produced into a reflexed tongue-like process in front, and the posterior part of the head is produced into a broad lamina, forming two lobes, of which the extremities diverge widely. The front tibiæ are long, with blunt external teeth, and produced into a finger-like process at the tip.

♀. The clypeus is feebly bilobed in front and the posterior margin of the head is rather narrowly notched. The front tibiæ are broad and strongly toothed.

Length, 9–12·5 mm. ; breadth, 5·5–6·5 mm.

SIND : Karachi (*K. Bernhardt*, Sept.). S. INDIA : Coimbatore (*K. G. Nambiar*, Sept.) ; Harivanam, Bellary District (August).

Type in the Paris Museum.

92. Phalops olivaceus.

Phalops olivaceus Lansb., Stett. Ent. Zeit. xliv, 1883, pp. 164, 169.

Deep bluish- or greenish-black, opaque, rather thinly but uniformly clothed above with fine short yellowish hairs, smooth and shining beneath.

Parallel-sided, not very broad. The *clypeus* is rugose and separated by a gently curved carina from the forehead, which is coarsely granulate. The ocular lobes are very prominent laterally. The *pronotum* is closely but not very finely rugose or shagreened, except at the sides, which are coarsely granulate. The front angles are blunt, the lateral margin sinuate just behind the front angle and nearly straight behind, and the base is gently rounded. The *elytra* are very finely striate, the intervals flat and closely rugose. The *pygidium* is rather closely punctured. The *metasternum* is very finely and irregularly punctured, very scantily at the sides.

♂. The clypeus is bluntly produced and strongly reflexed in the middle and the ocular lobes are strongly reflexed. The posterior part of the head is produced backwards as a broad flat plate, cleft at the end, and forming two diverging angular lobes. The pronotum is a little hollowed behind the posterior cephalic process.

Length, 11 mm. ; breadth, 6·5 mm.

INDIA (*Capt. Boys*).

Type in M. René Oberthür's collection.

The unique type from the Castelnau collection bears only "India" as locality. as do a pair in the British Museum.

Genus ANOCTUS

Anoctus Sharp, Col. Hefte, xiii, 1875, p. 49.

TYPE, *A. lævis* Sharp. (Singapore, Sumatra, Borneo.)

Range. Malayan Region, South India.

Body broadly rounded, very compact, extremely smooth and shining, without hairs or setæ above, and with only very scanty clothing beneath. Head flat and moderately broad, the lateral lobes completely fused with the clypeus, dilated before the eyes, which are very small as seen from above. Antennæ 9-jointed. Lateral margins of the pronotum gently curved, not strongly bent in the middle, the hind angles distinct, the base rounded, not margined, the front angles a little excavated beneath. Scutellum absent. Elytra with the epipleuræ broad and acutely inflexed. Legs very short, the front tibia armed with four short external teeth, the terminal one not very oblique, the middle and hind tibiæ dilating from base to apex. Tarsi not very short, those of the four posterior legs with joints 1–4 successively diminishing in length and breadth. Maxillæ short, with the terminal lobes small, the palpus with long last joint. Mentum transverse, feebly bilobed, the labial palpi with the basal joint short, the 2nd oval, the 3rd very minute.

This genus differs from *Caccobius* and *Onthophagus* in its slightly different and very compact shape, the sides of the prothorax being continuous with those of the elytra and its hind angles quite distinct. The only two known species have both been assigned to *Onthophagus*, *O. scatonomoides* Lansb. being identical with *A. lævis* Sharp. Probably both are inhabitants of ants' nests.

93. Anoctus myrmecophilus.

Onthophagus myrmecophilus Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 431.

Black or dark reddish-black, very smooth and shining, the head and pronotum red, with a faint metallic lustre, and each elytron decorated with a basal red patch reaching the outer, but not the inner, margin. The legs, antennæ, and mouth-organs are also red. The upper surface is entirely, and the lower surface almost, without hairs or setæ.

Oval and very compact, not very convex, with very short legs. The *head* is finely and not closely punctured, fairly broad, with the ocular lobes subangular externally, and with a feeble transverse carina between the eyes. The *pronotum* is very finely and sparsely punctured. The front angles are sharp, the lateral margins gently curved in front, straight from before the middle to the base, the hind angles very well marked, and the base gently rounded. The *elytra* are finely striate, the intervals flat and almost unpunctured. The *pygidium* is convex, smooth, and unpunctured. The metasternal shield is very smooth and unpunctured, and the sides of the *metasternum* are distinctly but shallowly punctured.

♂. The clypeus is a little produced in front, and the anterior

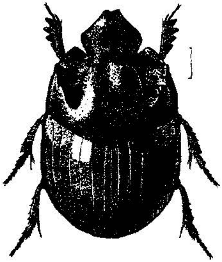

Fig. 7.—*Anoctus myrmecophilus*, ♂.

margin is strongly reflexed and sometimes feebly notched in the middle. The pronotum is hollowed out on each side of its anterior part, the posterior margin of the cavity sharply defined and produced into a strong outer and feeble inner tooth.

♀. The front margin of the head is evenly rounded and the pronotum is quite simple.

Length, 4–6 mm.; breadth, 3–3·5 mm.

S. INDIA: Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

This little beetle is peculiar both in its habits and appearance. It was found in some numbers by Mr. Andrewes in a nest of the harvesting ant (*Phidologiton diversus*) in a decaying *Ficus* trunk. The specimens were taken from the debris accumulated near the entrance to the nest, and Mr. Andrewes believes the beetle to breed in the nest, which is probably the case. The rounded shape, very shining surface, and short legs

produce, in the female at least, a strong resemblance to a Histerid. The lateral margins of the prothorax are much more feebly curved than in *A. lævis* Sharp, and the produced clypeus and armed thorax of the male show the genus to be nearly related to *Caccobius*, of which it has the hollowed front angles of the thorax but not the truncate front tibiæ.

Genus DISPHYSEMA.

Disphysema Har., Col. Hefte, xi, 1873, p. 102.

TYPE, *D. candezei* Har.

Range. S. India.

Wingless, very narrow-waisted, with the hind-body very small and globose and the elytra fused together, short, jointly narrower at their widest part than the pronotum and much narrower at the shoulders. Head without sutures, the ocular lobes not separated from the clypeus, which is strongly bidentate in front, the teeth rather narrowly separated. Pronotum broad, strongly and uniformly convex, the front angles sharply produced, the base strongly and uniformly rounded. Scutellum absent. Elytra reduced, united, very convex, with the sides strongly and uniformly rounded. Sides of the prothorax deeply hollowed beneath the front angles. Legs stout and rather long. Front tibia armed with four strong teeth, middle and hind tibiæ dilating from base to extremity. Antenna 9-jointed. Maxilla with small, subequal, inner and outer lobes and long palpus. Mentum bilobed, the palpus with narrow, subequal 1st and 2nd joints and the 3rd minute.

94. Disphysema candezei.

Disphysema candezei Har.,* *Col. Hefte, xi, 1873, p. 102.*

Dull sooty-black above and shining black beneath, sometimes with a feeble bluish or greenish lustre, the organs of the mouth and foot-stalk of the antenna, but not the club, reddish, the body clothed above and beneath with rather coarse and uneven greyish-yellow hair.

Very convex, with the body strongly constricted between the pronotum and elytra, the upper surface closely granular, the legs rather long. The *head* and *pronotum* are similarly, closely and uniformly covered with small roundish granules. The *clypeus* is deeply notched in the middle of the front margin and produced into two teeth. There is a short curved carina between the clypeus and forehead, and the hinder margin of the head is slightly produced upwards in the middle. The *pronotum* is uniformly convex, a little wider than the

elytra, with the front angles rather sharply produced, the hind angles obsolete, and the base uniformly rounded. The *elytra* are very short, very convex, and suborbicular in shape, the sides and apices forming part of a circle and the shoulders being rather strongly contracted. The striæ are distinct but not deep, rather shining, with the intervals flat and opaque, and bearing minute and not very close shining granules. The metasternal shield is rather sparingly but uniformly punctured, and the sides of the *metasternum* a little more closely and finely. The posterior tarsi are rather long, and *the basal joint of the hind pair is serrate beneath.*

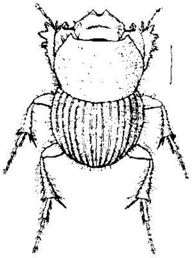

Fig. 8.—*Disphysema candezei.*

♂. The pronotum is relatively larger than that of the female and considerably wider than the conjoined elytra. The front *tibia is elongate and rather strongly curved, and the extremity of its inner edge is produced into a sharp point.*

Length, 7–8·5 mm.; breadth, 4–5 mm.

MADRAS: Coimbatore (*M. J. Walhouse*).

Type in the Brussels Museum.

Genus CACCOBIUS.

Caccobius Thoms., Skand. Col. v, 1863, p. 34; D'Orb., Ann. Soc. Ent. France, 1913, p. 16.
Caccophilus Jekel, Rev. Mag. Zool. 1872, p. 410.
Cacconemus Jekel, op. cit. p. 418.

TYPE, *Scarabæus schreberi* L. (Western Europe).

Range. The Old World.

The species of this genus are of short compact form and generally of small size; some of them very small. The front angles of the thorax have a deep hollow beneath, sharply

defined. The legs are short, the front tibia very short an broad, with its terminal tooth not placed obliquely, as usua but straight, its anterior edge forming a right angle with th inner edge of the tibia. The antenna consists of eight joints.

In many of the species the terminal tooth of the fror tibia assumes a peculiar form in the male. It is of rectangul shape, *not pointed, thin and translucent, and often bent* a an angle to the rest of the tibia.

In other respects the characters of the genus are those c *Onthophagus*. Males may be armed with a single short hor a pair of horns, or they may be entirely without armature.

Several of the species are carrion-feeders.

Key to the Species of Caccobius.

1	(22)	More or less setose above.	
2	(5)	Clypeus not notched or bilobed.	
3	(4)	Clypeus rounded; setæ scarcely visible above	*atcrrimus* F., p. 143.
4	(3)	Clypeus pointed: setæ long above.	*diminutivus* Walk., p. 14
5	(2)	Clypeus more or less bilobed or notched.	
6	(21)	Not entirely opaque above.	
7	(12)	Pronotum simply punctured.	
8	(9)	Clypeus strongly bilobed	*torticornis*, sp. n., p. 144.
9	(8)	Clypeus feebly bilobed.	
10	(11)	Metasternum not punctured in the middle; ♂ with a cephalic horn. .	*unicornis* F., p. 145.
11	(10)	Metasternum well punctured: ♂ not horned	*inermis*, sp. n., p. 147.
12	(7)	Pronotum granulate at the sides.	
13	(18)	Pronotum closely punctured.	
14	(15)	Elytra very shining	*gallinus* Arrow, p. 148.
15	(14)	Elytra not shining.	
16	(17)	Elytra brown, variegated	*meridionalis* Bouc., p. 148
17	(16)	Elytra entirely black	*ultor* Sharp, p. 150.
18	(13)	Pronotum not closely punctured.	
19	(20)	Elytra with orange apical patch...	*vulcanus* F., p. 151.
20	(19)	Elytra without orange apical patch	*indicus* Har., p. 152.
21	(6)	Entirely opaque above	*himalayanus* Jek., p. 153
22	(1)	Very smooth above, without setæ or hairs.	
23	(24)	Clypeus entire....................	*pantherinus* sp. n., p. 154
24	(23)	Clypeus more or less excised in front.	
25	(28)	Punctures of pronotum numerous.	
26	(27)	Pygidium entirely black; elytra usually black, with pale apical margin; head of ♂ horned......	*denticollis* Har., p. 155.
27	(26)	Pygidium black and yellow; elytra usually black, with yellow pattern; ♂ not horned	*gonoderus* Fairm., p. 157.
28	(25)	Punctures of pronotum very few and scattered.....................	*rufipennis* Mots., p. 158.

95. **Caccobius aterrimus.**

Copris aterrimus F.,* Ent. Syst. Suppl. 1798, p. 35.
Ateuchus aterrimus F., Syst. Eleut. i, 1801, p. 65.
Caccobius aterrimus Har., Col. Hefte, ii, 1867, p. 9.
Caccobius haroldi Jek., Rev. Mag. Zool. 1872, p. 416.

Black, opaque above, with the legs and antennæ reddish, the upper surface bearing scanty and exceedingly minute, hardly perceptible, pale setæ.

Broadly oval, compact and not very convex. The *head* is short and fairly broad, with very minute and scanty punctures, the sides nearly straight and slightly divergent in front of the eyes, the *clypeus* short, with its front margin rounded and separated by a rather feeble carina from the forehead. The *pronotum* is strongly, but not closely, punctured, with rather large round pits. The front angles are rather sharp, the sides are very obtusely angulate a little behind the front angles, nearly straight from this point to the middle, and feebly sinuate behind, and the base is obtusely angulate in the middle. The *elytra* are rather strongly striate, the intervals flat and finely and scantily punctured. The *pygidium* is finely and scantily punctured, the metasternal shield minutely and very scantily, and the sides of the *metasternum* are rather coarsely and closely pitted.

♂. The head bears a slight transverse ridge just before the hind margin.

♀. The clypeus is rugosely punctured just within the front margin.

Length, 4–5 mm. ; breadth, 3 mm.

MADRAS: Chipnrupalle, Vizagapatam District (*R. S. Patuck*); Calicut, Malabar Dist. (*M. Maindron*, June); Mahé, Malabar Coast (*M. Maindron*, July); Coconada (*Simson*). C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, May). CEYLON: Colombo (*G. M. Henry*, Feb., March, April, Aug., Sept.); Trincomalee (*T. Bainbrigge Fletcher*, July).

Type in the Copenhagen Museum.

The two sexes differ hardly at all.

Specimens of this species were found by Mr. G. M. Henry in a food-ball of *Scarabæus gangeticus*.

96. **Caccobius diminutivus.**

Copris diminutivus Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208.
Onthophagus setulosus Motsch.,* Bull. Soc. Nat. Mosc. xxxvi, 1863, 2, p. 459 (new syn.).

Black and shining, with the legs and antennæ reddish, the upper surface of the body clothed with erect, rather sparse, but regular and not very short pale setæ.

Minute, broadly oval, compact and not very convex. The *head* is not wide nor long, and bears only a few scattered punctures, the *clypeus* is bluntly pointed in front, with its sides nearly straight. The *pronotum* is coarsely and fairly closely punctured. Its front angles are fairly sharp, the sides rounded in front and behind, and the base well rounded. The *elytra* are finely striate, the intervals flat and sparingly but fairly strongly punctured. The *pygidium* is coarsely and unevenly but fairly closely punctured. The *metasternum* is strongly and closely punctured at the sides, sparsely in the middle, with large and fine punctures intermixed.

♂. The hind margin of the head bears a pair of short, nearly straight and parallel horns, inclined obliquely backwards.

♀. The head bears slight prominences in the place of the horns.

Length, 3–3·5 mm. ; breadth, 2 mm.

BENGAL : Singla, Darjeeling Dist., 1500 ft. (June) ; Calcutta (*Maude Cleghorn*, Aug.). C. PROV. : Nagpur, 1000 ft. (*E. A. D'Abreu*, June, July). CEYLON : Kitulgala, 1700 ft. (*G. Lewis*, Jan.) ; Labugama (*G. M. Henry*, Jan.) ; Nilaveli (*C. F. S. Baker*, Aug.) ; Battaramulla, W. Prov. (*G. M. Henry*, March).

Type in the British Museum ; that of *setulosus* in the Moscow Museum.

This is very easily recognized by the rather coarse and uniform erect setæ with which the upper surface is clothed. Two specimens in the collection of the Pusa Institute were taken by Miss Cleghorn from flowers of the carrion-scented *Typhonium trilobatum*, in company with specimens of *Onthophagus tarandus*.

97. **Caccobius torticornis**, *sp. n.*

Black, shining, with a small deep red spot upon each shoulder and a red marginal patch at the extremity of each elytron. The antennæ and legs are also reddish. The head and the anterior part of the pronotum are sometimes slightly metallic. The upper surface is fairly sparsely clothed with minute greyish setæ.

Broadly oval, compact and convex. The *head* is broad behind and bluntly angular in front of the eyes, the *clypeus* sharply bidentate, with its sides straight and convergent. The *pronotum* is moderately strongly but not very closely punctured. The front angles are fairly sharp, the sides nearly straight in front, feebly curved behind, and the base is gently rounded. The *elytra* are finely striate, the intervals flat and minutely and sparsely aciculate-punctate. The *pygidium* is fairly strongly but not very closely punctured. The

metasternum bears a few large punctures at the sides and in the middle.

♂. The head is shining and very minutely punctured, the clypeus very sparingly, the forehead rather more numerously, the head and clypeus indistinctly separated. The posterior margin is produced backwards as a flat plate, of which the angles are produced into short, sharp horns, curving forward and then backward, and having a short, blunt process between them. The pronotum is broadly vertical in front, and the upper margin of the declivity is sharp and not produced in the middle. The teeth of the front tibia are short.

♀. The clypeus and forehead are separated by a strong curved carina, the clypeus rugose and very strongly bidentate, the forehead rugosely punctured. The pronotum is uniformly convex. The teeth of the front tibia are long and sharp.

Length, 4·5–5·5 mm. ; breadth, 3–3·5 mm.

U. Prov. : Dehra Dun (*S. N. Chatterjee*, *M. Cameron*, July ; *G. D. Bhasin*, June) ; Kali Valley, Almora, 5000 ft. (*R. N. Parker*, July).

Type in the British Museum.

Found by Dr. M. Cameron feeding upon carrion.

This closely resembles *C. tortus* Shp., of which Sharp mentions (Col. Hefte, xiii, 1875, p. 54) having seen an example from Bengal. There are specimens of *C. tortus* in the British Museum labelled Java and China, and it is probably not found in India. *C. torticornis* has the clypeus more strongly bidentate, the horns of the male closer together, with a short process between them, and the prothoracic carina straight and not sinuate as in *C. tortus*.

98. **Caccobius unicornis.**

Copris unicornu F.,* Ent. Syst. Suppl. 1798, p. 33.
Copris unicornis F., Syst. Eleut. i, 1801, p. 52.
Onthophagus unicornis Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 236.
Onthophagus nitidiceps Fairm., Ann. Soc. Ent. Belg. xxxvii, 1893, p. 304 (new syn.).

Black or pitchy, usually with the clypeus, elytra, and legs dark red. The antennæ and mouth organs are yellow, and the upper and lower surfaces are clothed with minute pale setæ.

Minute, very broadly oval and compact, and moderately convex. The *head* is rather short and broad, with the clypeus slightly bilobed in front and rounded at the sides. The *pronotum* is evenly and moderately strongly punctured. The front angles are very blunt and not produced, the lateral margins are rounded in front, feebly sinuate behind, and the

base is rounded. The *elytra* are finely striate, the 7th stria is strongly curved, the intervals are flat and minutely and sparingly punctured. The *pygidium* is finely and not closely punctured. The metasternal shield is almost smooth in the middle, but bears a few large punctures in front, behind, and at the sides, and the sides of the *metasternum* are coarsely pitted. The legs are short, and the hind tibia is broad at the extremity.

♂. The head is shining, with only a few scattered punctures, and bears a short, erect horn with a depression behind it.

♀. The head bears intermixed large and small punctures, the clypeus is separated by a rounded carina from the forehead, and there is a short, straight, posterior carina.

Length, 3–3·5 mm.; breadth, 2–2·5 mm.

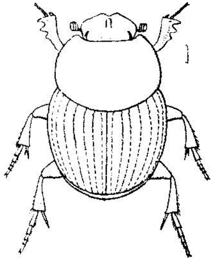

Fig. 9.—*Caccobius unicornis*, ♂.

CEYLON: Colombo (*G. Lewis*, April); Kandy (*G. Lewis*, Feb.). CENTR. PROV.: Motinala R., S. Mandla (*N. C. Chatterjee*, June); Mohand Rau (*Dr. M. Cameron*, Sept.). U. PROV.: Mackinnon Park, Mussoorie (*C. F. C. Beeson*, Sept.); Fyzabad (*R. W. G. Hingston*). ASSAM: Haflong, Cachar (*C. F. C. Beeson*, May); Sadiya (*W. Doherty*). E. BENGAL: Chittagong. TONKIN. CHINA. JAVA. BORNEO. PHILIPPINE IS. MALAY PENINSULA.

Type in the Copenhagen Museum.

Copris unicornis was attributed by Fabricius to Tranquebar, but this was the result of a confusion of species. The specimen actually described, which I have examined at Copenhagen, is a male example from Java, but with it were placed two specimens of *Onthophagus pusillus* from Tranquebar, perhaps supposed by Fabricius to be females of the same species.

As this is a hornless form, it is obvious that the name cannot be applied to it, although its locality was mistakenly recorded.

C. unicornis has a remarkably close resemblance to *Onthophagus centricornis* in all but those features which distinguish the genus *Caccobius*, viz., the squared front tibia and the front angles of the prothorax hollowed beneath. It is a rather broader insect, the elytra are not so light in colour, and the front angles of the thorax are more broadly rounded.

99. **Caccobius inermis**, sp. n.

Black and shining, with the legs, the antennæ (except the club, which is black), and usually the hinder margin and the posterior part of the lateral margin of each elytron, orange-red. The upper surface bears a thin clothing of very fine pale setæ.

Minute, broadly oval, compact and moderately convex. The *head* is not very broad, sparingly punctured, strongly rounded at the sides, with the *clypeus* feebly and bluntly bilobed. The *pronotum* is evenly and moderately strongly but not closely punctured. The front angles are blunt, the sides nearly straight in front and behind, and the base gently rounded. The *elytra* are finely striate, the intervals flat and finely and sparingly punctured. The *pygidium* bears sparse and very shallow pits and the *metasternum* is coarsely and closely pitted at the sides and moderately strongly punctured in the middle, where there is a broad depression.

♂. The head is without a carina, and the terminal tooth of the front tibia is short, truncate, thin and translucent, and set at an oblique angle to the tibia.

♀. The clypeus and forehead are separated by a curved carina, and the teeth of the front tibia are long and sharp.

Length, 3 mm.; breadth, 2 mm.

SIKKIM: Pedong, 6000 ft. (*R. W. G. Hingston*, Mar.). U. PROV.: Fyzabad (*R. W. G. Hingston*); W. Almora, Kumaon (*H. G. Champion*). CENTR. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, Aug.). BENGAL: Calcutta. CEYLON: Wirawila, S. Prov. (July).

Type in the British Museum.

This little insect has a deceptive resemblance to the female of *C. unicornis* F. The latter usually shows a posterior prominence upon the head which is absent in *C. inermis*, and the metasternum is much smoother. There is also a close resemblance to the female of *Onthophagus centricornis* F., but the different shape of the front tibia will distinguish the latter.

100. Caccobius gallinus.

Caccobius gallinus Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 424.

Black and shining, with the head and pronotum usually more or less coppery, the legs and antennæ (except the club) deep red, and the upper surface fairly closely clothed with fine erect setæ.

Broadly oval and moderately convex. The *head* is short, the *clypeus* bluntly bilobed, with its sides almost straight, and separated by a curved carina from the forehead. The *pronotum* is rather closely and not very finely punctured. Its front angles are rather blunt, the sides gently rounded in front and nearly straight behind, and the base rounded. The *elytra* are finely striate, the intervals slightly convex and moderately finely and sparsely asperate-punctured. The *pygidium* is shining and rather strongly punctured. The *metasternum* is rather finely and sparsely punctured in the middle, and coarsely and shallowly pitted at the sides.

♂. The clypeus is shining, with only a very few punctures, and feebly bilobed, and the posterior margin of the head bears an erect, quadrate, not very broad lamina, the angles of which are produced into short, slender, parallel horns, curving a little backwards. Between the horns the upper edge of the lamina is obtusely angular. The pronotum is a little hollowed in front and nearly vertical in the middle. The terminal tooth of the front tibia is thin, blunt, and inclined obliquely to the tibia.

♀. The clypeus is rugose and rather strongly bilobed, the forehead is rather rugosely punctured, and there is a sharp carina at the posterior margin of the head. The pronotum has a slight rounded prominence in the middle above the front margin. The terminal tooth of the front tibia is strong and sharp.

Length, 4–5 mm. ; breadth, 2·5–3 mm.

S. INDIA : Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

101 Caccobius meridionalis.

Caccobius meridionalis Bouc.,* Ann. Mus. Civ. Genova, xlvii, 1914, p. 239.

Chestnut-brown, the head and pronotum suffused with a coppery lustre and the elytra yellow, with the suture brown and longitudinal brown stripes, not reaching the front and hind margins, upon the 3rd, 5th, and 7th intervals, often fused together in the middle. There is usually also a brown shoulder-stripe, the femora and pygidium are usually yellow,

the remainder of the legs reddish and the lower surface dark, and the body is clothed above and beneath with minute pale setæ.

Oval, very convex, not very shining. The *clypeus* is bilobed, with its sides straight, and separated from the forehead by a curved carina. The *pronotum* is rather closely and strongly punctured posteriorly, the punctures replaced by fine granules anteriorly and at the sides, with a well-marked longitudinal median groove in the posterior part. The front angles are rather blunt, the lateral margins feebly rounded in front, feebly sinuate behind, and the base strongly rounded. The *elytra* are subopaque, finely striate, with the intervals flat and minutely and sparsely asperate-punctate. The *pygidium*

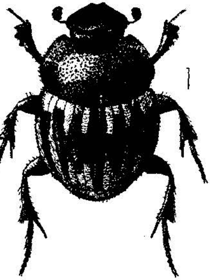

Fig. 10.—*Caccobius meridionalis*, ♂.

is rather strongly but not closely punctured, and the *metasternum* is sparsely but distinctly and evenly punctured.

♂. The clypeus is smooth and shining, with a few scattered punctures, feebly bilobed and not separated from the forehead, and the posterior part of the head is produced into a flat, not very broad plate, the angles of which are produced into a pair of short upward-curving horns, not far apart, with a slight angulation between them. The pronotum is smooth and a little hollowed behind the cephalic horn, the margin of the hollow not sharply defined. The terminal tooth of the front tibia is very blunt and set obliquely.

♀. The clypeus is rugose and bluntly but fairly strongly bilobed, with a strong curved carina separating it from the forehead. The posterior part of the head is elevated into a strong, sharp carina. The pronotum has a slight horizontal

prominence in the middle anteriorly. The terminal tooth of the front tibia is long and sharp.

Length, 4–5 mm. ; breadth, 2·5–3 mm.

CENTR. PROV. : Nagpur 1000 ft. (*E. A. D'Abreu*, May, Aug., Sept.). S. BOMBAY : Dharwar (*H. Swale*, Oct., Jan.). S. INDIA : Mahé, Malabar (*M. Maindron*, July) : Nilgiri Hills (*H. L. Andrewes*) ; Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May) ; Bangalore (*C. F. C. Beeson*, Aug.). CEYLON : Colombo (*H. P. Green*, April ; *G. M. Henry*, Aug.) ; Galle (*G. Lewis*) ; Rangala (*G. M. Henry*, April) ; Battaramulla, W. Prov. (*G. M. Henry*, Mar.)

Type in M. Boucomont's collection.

Found by Dr. Beeson in a dead lizard.

102. **Caccobius ultor.**

Caccophilus ultor Sharp,* Col. Hefte, xiii, 1875, p. 50.

Black, with the head and pronotum dark bronzy and an inconspicuous reddish or orange transverse bar at the posterior margin of each elytron.

Oval, compact and convex. The *head* is short and broad, with the *clypeus* bilobed and separated by a curved carina from the forehead. The *pronotum* is strongly and very closely punctured, with its front margin vertical in the middle and more or less produced horizontally at the upper edge. The lateral margin is nearly straight in front and behind, the front angle fairly sharp, the hind angle obsolete, and the base gently rounded. The *elytra* are finely striate, the intervals flat and finely asperately punctured in double series. The *pygidium* is shining and fairly strongly but not closely punctured. The *metasternum* is grooved along the middle and bears scattered and not very fine punctures.

♂. The clypeus is very feebly bilobed, rather sparingly punctured and shining, and the forehead feebly punctured. The vertex bears a pair of short, erect, pointed horns, united by a lamina at the base. The dorsal prominence of the pronotum is produced into a rather narrow, truncate, horizontal process. The terminal tooth of the front tibia is thin, very blunt, and bent at an oblique angle.

♀. The clypeus is rugose and rather strongly bilobed and the forehead feebly punctured. The head bears a strongly elevated carina between the eyes. The thoracic prominence is very short and truncate. The terminal tooth of the front tibia is fairly sharp.

Length, 4·5–5 mm. ; breadth, 3 mm.

BOMBAY : Khandesh (*T. R. D. Bell*).

Type in M. René Oberthür's collection.

This species has a close resemblance to *C. vulcanus*, but the pronotum is more closely punctured. The cephalic horns of the male are more sharp and slender, and the dorsal process is a little narrower.

103. **Caccobius vulcanus.**

Copris vulcanus F.,* Syst. Eleut. i, 1801, p. 41.
Copris bicuspis Wied.,* Zool. Mag. ii, 1, 1823, p. 18.
Caccophilus mutans Sharp,* Col. Hefte, xiii, 1875, p. 51 (new syn.)

Black, with the head and pronotum shining golden-red, coppery or greenish, and the elytra scarcely shining, with a short transverse orange or reddish bar at the posterior

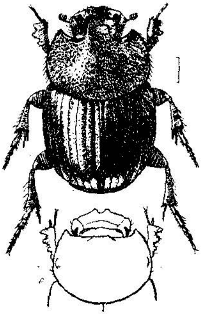

Fig. 11.—*Caccobius vulcanus*, ♂, and (below) anterior part of ♀.

margin of each. The upper surface bears a thin clothing of minute pale setæ.

Oval, compact, and convex. The *head* is short and broad, the *clypeus* bilobed and separated by a curved carina from the forehead. The *pronotum* is fairly strongly, evenly, and closely punctured, the punctures replaced by granules at the sides, with its front margin vertical in the middle and its upper edge more or less produced horizontally. The lateral margin is nearly straight in front and behind, the front angles are fairly sharp, the hind angles obsolete, and the base gently rounded. The *elytra* are finely striate, the intervals flat and minutely asperately punctured in double series. The *pygidium* is shining and rather strongly but not closely punctured

The *metasternum* is strongly grooved along the middle and bears scattered punctures, which are rather large except at the sides, where they are fine.

♂. The clypeus is very feebly bilobed, finely and sparsely punctured and shining, and the forehead is very shining and almost unpunctured. The vertex bears a broad erect lamina, the ends of which are produced into a pair of short, flat, truncate horns placed rather far apart and feebly divergent. The dorsal prominence of the pronotum is slightly produced at each angle. The terminal tooth of the front tibia is thin, very blunt, and bent at an oblique angle.

♀. The clypeus is rugose and rather strongly bilobed, and the forehead is sparsely punctured. The posterior margin of the head bears a strongly elevated carina, sometimes a little emarginate in the middle. The thoracic prominence is truncate. The terminal tooth of the front tibia is rather sharp.

Length, 4–5 mm.; breadth, 3 mm.

Bihar: Pusa (*A. Murtaza*, May). C. Prov.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June). S. India: Bangalore (*C. F. C. Beeson*, Aug.). Ceylon: Colombo (*G. M. Henry*, Aug.); Maha Illuppalama (*E. E. Green*, Aug.); Battaramulla, W. Prov. (*G. M. Henry*, Mar.).

Type in the Copenhagen Museum; also that of *bicuspis* Wied.; that of *mutans* Sharp in M. René Oberthür's collection.

M. Boucomont has stated (Ann. Soc. Ent. France, lxxxiii, 1914, p. 328) that *Copris bicuspis* Wied., is identical with *Caccobius tortus* Sharp, but the latter is a different species, found in Java.

104. Caccobius indicus.

Caccobius indicus Har., Col. Hefte, ii, 1867, p. 12.

Black, with the head and pronotum very shining and generally deep bluish- or greenish-black, and the elytra not very shining. The antennæ, front tibiæ, and tarsi are reddish, and the upper surface bears very scanty and minute pale setæ.

Broadly oval and convex. The *head* is short and broad, the *clypeus* bilobed and separated by a strong carina from the forehead, which bears only a few fine punctures. The vertex bears a very strongly elevated carina. The *pronotum* is rather strongly and evenly, but not closely, punctured, the punctures replaced by granules at the sides. There is a slight transverse prominence at the front of the pronotum in the middle. The sides are nearly straight in front, gently rounded behind, the front angles are rather sharp, the hind angles obsolete, and the base is gently rounded. The *elytra* are finely

striate, with the intervals flat, and minutely and sparingly asperate-punctate. The *pygidium* bears a few rather large scattered punctures. The *metasternum* is deeply grooved along the middle and bears rather large scattered punctures, except at the sides, where the punctures are very fine.

♂. The clypeus is feebly bilobed, shining, and finely and scantily punctured. The posterior carina of the head is more or less prominent at each end, and the transverse thoracic prominence also is feebly prominent at each angle. The terminal tooth of the front tibia is very blunt, thin, and bent at an oblique angle to the tibia.

♀. The clypeus is rather strongly bilobed and transversely rugose. The angles of the posterior cephalic carina are not produced, and the thoracic prominence is slight. The terminal tooth of the front tibia is sharp and not oblique.

Length, 4–6 mm. ; breadth, 2·5–3 mm.

S. India : Bangalore (*C. F. C. Beeson*, Aug.) ; Nilgiri Hills (*H. L. Andrewes*).

Many specimens were found by Dr. Beeson feeding upon a dead lizard.

The two sexes usually differ very little, but occasionally male specimens occur in which the transverse elevations upon the head and thorax are much more developed.

105. **Caccobius himalayanus.**

Caccophilus himalayanus Jekel,* Rev. Mag. Zool. 1872, p. 411.
Caccobius himalayanus Bouc., Ann. Soc. Ent. France, lxxxviii, 1919, p. 320.

Dull reddish-brown, with the pronotum black, except at the sides, which are mottled with black, the elytral intervals also with longitudinal black mottling, the head, the anterior part of the pronotum, and parts of the lower surface with a dark coppery lustre. The upper surface and pygidium are opaque, with extremely minute erect setæ.

Oval and not very convex. The *clypeus* is a little produced and bilobed in front. The *pronotum* is rather evenly, but not very densely, covered with minute granules, with the anterior margin smoother and more shining. The lateral margin is strongly angulate, feebly curved in front and sinuate behind, with the hind angle slightly indicated and the base obtusely angulate in the middle. The *elytra* are finely striate, with the intervals flat and strewn, less closely than the pronotum, with minute granules. The *pygidium* bears a few scattered punctures. The metasternal shield is rather strongly punctured and the sides of the *metasternum* more finely.

♂. The clypeus is distinctly produced and moderately punctured, the punctures becoming very fine and sparse

upon the forehead, which is not separated from the clypeus. The posterior part of the head is produced backward as a flat triangular lobe, the apex of which is elongate and curved upwards as a slender horn. The middle of the anterior margin of the pronotum is excavated to receive the convex part of the cephalic lobe, and the front angles are produced and smooth. The teeth of the front tibia are sharp.

♀. The clypeus is closely rugulose and separated from the forehead by a strong curved carina, and there is a straight carina upon the vertex. There is a slight blunt prominence just behind the front margin of the pronotum.

Length, 5·5 mm. ; breadth, 3·5–4·5 mm.

Kashmir : Lidarwat, Lidar Valley, 9000 ft. (*B. M. Bhatia*, June) ; Gulmarg, 8500 ft. (*B. M. Bhatia*, May) ; Pahlgam,

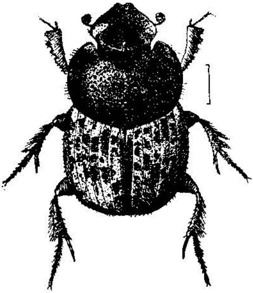

Fig. 12.—*Caccobius himalayanus*, ♂.

Lidar Valley, 7000 ft. (*C. F. C. Beeson*, June) ; Dardpur, Lolab Valley, 6500 ft. (*C. F. C. Beeson*, May) ; Hardwan, Pohru Valley, 6000 ft. (*B. M. Bhatia*, May) ; Batote, Udhampur Division, 5500 ft. (*C. F. C. Beeson*, May). Punjab : Kotgarh, Simla Hills, 7000 ft. (*S. N. Chatterjee*, Sept.) ; Kulu, 4000 ft. (*O. H. Walters*, May). U. Prov. : Konain, 7800 ft. (*M. Cameron*, May) ; Kanasar, Chakrata district, 7050 ft. (*S. N. Chatterjee*, May).

Type in the Dresden Museum.

106. **Caccobius pantherinus**, *sp. n.*

Shining dark coppery, the elytra yellow, each with the sutural interval, the outer margin, and six spots, one before and one behind the middle, upon the 3rd, 5th, and 7th intervals,

black. The innermost anterior spot is sometimes united with the black sutural margin, and it is probable that the six spots sometimes form two transverse bands. The pygidium is coppery at the base and yellow at the apex and the tarsi, antennæ and mouth organs are red.

Oval and moderately convex, without hair or setæ upon the upper surface. The *head* is fairly closely and finely punctured, strongly rounded at the sides, with the clypeus a little produced. The *pronotum* is rather evenly, not very strongly nor very closely, punctured. The front angles are rather sharp and the sides are feebly rounded in front, nearly straight behind, the hind angles obsolete, and the base strongly rounded. The *elytra* are finely striate, the intervals are flat and distinctly, not very finely, punctured. The *pygidium* is not very finely nor very closely punctured. The metasternal shield is strongly punctured in front and very finely and sparsely behind, and the sides of the *metasternum* bear large annular punctures.

♂. The clypeus is produced into a narrow reflexed process, the clypeo-frontal carina is almost obsolete, and the posterior part of the head is produced backwards as a broad triangular lamina, the apex of which forms a short, upwardly curved horn. The anterior part of the pronotum is broadly hollowed beneath the cephalic process.

♀. The clypeus is very slightly produced in front and separated by a slight curved carina from the forehead, and there is a straight posterior carina between the eyes.

Length, 5·5–7·5 ; breadth, 3·5–4·5 mm.

SIND : Karachi. PUNJAB : Ghazi Ghat, Muzaffargarh Dist. (*B. M. Bhatia*, Feb.).

Type in the British Museum.

107. Caccobius denticollis.

Caccobius denticollis Har., Col. Hefte, ii, 1867, p. 5.

Black, with the head and pronotum more or less coppery or metallic and the elytra with the hind margin yellow, except at the suture. The pale margin may be broken into two or three separate spots, and yellow or reddish spots may appear at the anterior margin (upon the 3rd and 6th intervals). Occasionally the pale border extends round the lateral margin to the base, or the elytra may be entirely pale except the sutural margins, or the sutural margins and dark longitudinal stripes upon the 3rd, 5th, and 7th intervals.

Very short, broad, and compact, with the sides not strongly rounded and very smooth and shining. The sides of the *head* are nearly straight and parallel. The *clypeus* is shining, and separated by a curved carina from the forehead, which is strongly punctured. The *pronotum* is finely punctured

dorsally, the punctures becoming stronger and closer at the sides, the front angles are rather sharp, the base is finely margined, with a very obtuse angle in the middle. The *elytra* are finely but distinctly striate, and the intervals finely and not closely punctured. The *pygidium* is shining and finely punctured, and the sides of the body beneath are distinctly punctured. The front tibiæ are very broad in both sexes and their teeth very sharp.

♂. The clypeus is short, punctured, with its front margin broadly rounded and very feebly excised in the middle, the anterior carina is short, and the posterior carina is produced

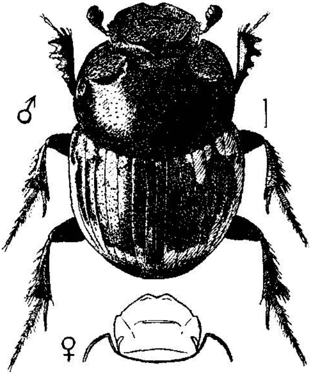

Fig. 13.—*Caccobius denticollis*, ♂, and head of ♀.

at each end into a short but slender vertical horn and feebly angulate in the middle. The anterior part of the pronotum bears four short processes placed at nearly equal distances, the two inner ones close to and vertically above the front margin, the two outer ones midway between the front and hind margins.

♀. The clypeus is rugose and its front margin notched in the middle, with the two angles a little produced, the anterior carina is long, and the posterior one not toothed. The pronotum has sometimes two slight lateral tubercles.

Length, 5–6 mm.; breadth, 3–4 mm.

KASHMIR : Pahlgam, Lidar Vall., 7000 ft. (*C. F. C. Beeson*, June) ; Dardpur, 6500 ft., Khurama, 5500 ft., Lolab Vall. (*C. F. C. Beeson*, May). PUNJAB : Kulu, Kangra District, 7000 ft. (*O. H. Walters*, Aug.). UNITED PROV. : Mussoorie, 6000–7000 ft. (*Col. Harcourt*, July, Sept. ; *C. F. C. Beeson*, Aug.) ; Jaunsar, Chakrata (*H. G. Champion*, Aug.) ; Konain, Chakrata, 7800 ft. (*M. Cameron*, May) ; Kotgarh, 7000 ft., Fagu, 8000 ft., Simla Hills (*S. N. Chatterjee*, Sept.) ; Pindar Valley, 8000–11,000 ft. (*H. G. Champion*) ; Sunderdhunga Valley, W. Almora, 8000–12,000 ft. (*H. G. Champion*).

Type in M. René Oberthür's collection.

The processes of the head and thorax may be absent in small males, and those of the thorax may be present in a rudimentary form in the female, but the bilobed clypeus and long anterior carina always distinguish the latter sex.

108. **Caccobius gonoderus.**

Onthophagus gonoderus Fairm., Ann. Soc. Ent. Belg. xxxii, 1888, p. 17 ; Bouc., Fauna Indoch. iv, 1921, p. 28.

Black, with the head and pronotum coppery or metallic and the elytra with bright yellow markings, generally consisting of interrupted basal, lateral, and apical margins, the basal margin with a short process on the 4th interval, sometimes uniting at the end with a spot on the 2nd interval, or the elytra may be yellow with a black sutural line and a small black shoulder-spot. The pygidium is black, with the apex yellow, or with two longitudinal yellow lines uniting at the apex, and the lower surface is black, with yellow spots at the sides of the abdomen.

Very short, broad, and compact, and very smooth and shining. The sides of the *head* are rather straight behind, and the *clypeus* is short and closely sculptured, separated by a curved carina from the forehead, which is closely punctured, and there is a posterior carina on the vertex. The *pronotum* is moderately finely punctured, and the punctures are a little stronger and closer at the sides, the front angles are sharp, the base gently rounded and very finely margined. The *elytra* are rather deeply striate, with indistinct punctures in the striæ, and fine but fairly close punctures in the intervals. The *pygidium* is shining and moderately punctured, the metasternal shield is finely punctured, and the sides of the *metasternum* rather strongly. The front tibiæ are broad and their teeth sharp.

♂. The clypeus is closely punctured, with its front margin broadly rounded and scarcely perceptibly excised in the middle, the anterior carina is feeble and not short, and the posterior carina is slightly elevated in the middle but not

at the ends. The middle of the anterior part of the pronotum forms a slight hump, divided by a slight depression anteriorly, and there is a slight sharp process on each side, midway between the front and hind margins.

♀. The clypeus is closely rugose, feebly produced in front and slightly notched in the middle. The pronotum has sometimes a slight tubercle on each side.

Length, 5–6 mm. ; breadth, 3–4 mm.

ASSAM : Shillong (*C. F. C. Beeson*, May) ; Manipur (*W. Doherty*). W. CHINA : Yunnan. TIBET.

This has a very close resemblance to *C. denticollis*, but the yellow markings normally show a greater development upon the elytra, and appear also upon the pygidium. It is also a little more strongly punctured. The male is without horns upon the head, and the two inner thoracic processes are feebler and less far apart.

109. Caccobius rufipennis.

Onthophagus rufipennis Motsch., Etudes Ent. vii, 1858, p. 53.
Caccobius rufipennis Har., Col. Hefte, ii, 1867, p. 8 (new syn.).

Black, very smooth and shining, with the elytra, legs, and antennal foot-stalk red, the suture and basal margin of the elytra generally dark. The upper surface is very smooth and shining and entirely devoid of hairs or setæ.

Minute, oval, compact, and convex. The *head* is not large, the *clypeus* is very short, with a few fairly large punctures, minutely bilobed in front and separated by a curved carina from the forehead, which is very smooth and bears a feeble transverse elevation. The *pronotum* bears a few fairly strong, irregularly scattered punctures. The front angles are blunt, the sides strongly rounded, and the base gently rounded. The *elytra* are finely striate, the intervals flat and without punctures. The *pygidium* bears a few fine scattered punctures. The *metasternum* bears a nearly semicircular incised line in front and is very smooth except at the sides, where it is finely punctured, and near the base in the middle, where there are a few fine punctures.

The two sexes are practically identical.

Length, 3 mm. ; breadth, 2 mm.

CEYLON : Colombo (*G. Lewis*, April ; *G. M. Henry*, Sept.) ; Yala, S. Prov. (*T. Bainbrigge Fletcher*, Feb.).

Types unknown.

Specimens were found by Mr. Henry in a food-ball of *Scarabæus gangeticus*. It has also been found in buffalo-dung.

Genus ONTHOPHAGUS

Onthophagus Latr., Hist. Nat. Crust. et Ins. iii, 1802, p. 141; Lacord., Gen. Col. iii, 1856, p. 107; d'Orb., L'Abeille, xxix, pp. 126, 132.

Proagoderus Lansb., Notes Leyd. Mus. v, 1883, p. 15; d'Orb., Ann. Soc. Ent. France, lxxxii, 1913, p. 493; Marcus, Arch. f. Nat. A 10, lxxxiii, 1917, p. 1.

TYPE, *Scarabæus taurus* L. (Europe)

Range. Almost world-wide, but only one species is found in New Zealand, and none in Polynesia.

Usually of rather short, compact form, smooth or clothed closely or sparsely with hairs or setæ, sometimes extremely minute and inconspicuous on the upper surface

Clypeus fused with the ocular lobes, very variable in shape, rounded, bilobed or acuminate in front Prothorax with the lateral margins angulate near the middle, the front angles produced, acute or blunt, the hind angles generally obsolete, the base rounded, obtusely angular or lobed in the middle. Scutellum absent. Elytra covering the abdomen and bearing a single lateral carina and seven dorsal striæ, the 7th reaching the shoulder-prominence but not the base, usually strongly curved but sometimes straight Pygidium generally bearing a transverse ridge parallel with the base and continuous with the lateral carinæ of the abdomen, coinciding with the margins of the elytra, but this is sometimes absent. Meso-metasternal suture nearly straight, the metasternal shield broad, with its anterior part flat, sloping, or sometimes vertical in the middle, and occasionally forming a short compressed process. Abdomen short, the last (6th) sternite extremely short in the male. Legs usually fairly stout. Femora thick. Front tibia usually armed with four, but occasionally only with three, external teeth, with minute denticles above and sometimes between them; middle and hind tibiæ dilating greatly from base to extremity, with the terminal margin generally nearly straight, but sometimes trilobed. Front tarsi slender and short; middle and hind tarsi a little flattened, with a very close fringe of stiff hairs along the inner edge and a looser fringe at the outer edge, the basal joint moderately long, the 2nd narrower, and generally less than half as long as the 1st, the 3rd about half the size of the 2nd, the 4th about half that of the 3rd, and the 5th slender. Antennæ short, composed of nine, or sometimes of eight, joints, the basal joint fairly long, occasionally with a serrate anterior edge. Mandible rather short. Maxilla with short and broad terminal lobe and moderately long 4-jointed palpus. Mentum transverse, the labial palpus with the basal joint small, not dilated, the 2nd moderately elongate, and the 3rd very minute.

The two sexes exhibit every degree of difference. The males are usually provided with horns or processes upon the

head or thorax or both. The females may have the same armature as the males (*O. tricornis*, *tarandus*, etc.), or may have a distinctive armature of their own (*O. sagittarius*, *imperator*), so that in some cases there is very little resemblance between the sexes, or they may be unarmed. In rare instances the antennæ differ sexually (*O. igneus*); very frequently the front tibiæ are elongate in the male, occasionally they are shorter (*O. tragoides*) and truncate at the end, as in both sexes of *Caccobius*. In *O. deflexicollis* the hind tibiæ differ sexually, and in *O. rubricollis* and a few others the middle and hind tarsi. In some species both sexes are without armature of any kind. It is always possible, however, to tell the sex of any specimen by examination of the last (6th) ventral segment. In the females this is always large and of nearly equal width, or a little wider in the middle. In males the middle part of this sternite is excised behind, so that it is very narrow in the middle and sometimes only visible at the sides. The sternites preceding the last are also commonly shorter in the male, so that the abdomen is shorter and less rounded than in the female.

The genus *Onthophagus* is the predominant genus of the COPRINÆ, vastly outnumbering all others in most parts of the world, although it is less abundant in America than in the Old World. It is one of the most numerous in species in the whole of the Coleoptera, more than 1400 species having been already described. It is probable that the number of species at present known from India is not more than half of those actually existing there.

The habits of this multiplicity of forms naturally vary greatly. The majority are no doubt dung-feeders, but many have been taken in carrion. Some exhibit special predilections, Sir Guy Marshall having found a certain South African species invariably attracted to dead snails, and an American form is found only in the burrows of the marmot (*Cynomys*). *O. deflexicollis* is said to occur only in vegetable detritus, and several species have been found in fungi. Fabre has given, in vol. v of his 'Souvenirs Entomologiques,' some account of the nesting habits of certain European members of the genus, and more recently Mr. Hugh Main has very carefully described the life-history of the British *Onthophagus taurus*, with excellent illustrations, in Proc. Ent. Soc. Lond. 1922, p. 14.

An orderly classification of the multitudinous species of the genus is a matter of very great difficulty. No satisfactory natural subdivision has ever been put forward. Bold attempts have been made by d'Orbigny and other specialists to tabulate the species inhabiting particular regions—Palæarctic, African, and Australian—but these tables present considerable difficulty

in use, and I have not found it possible to follow the systems employed in them. Nearly all the features by which the species are distinguished are liable to differ also in the two sexes of one or other of them, and some of the species differ so entirely in the sexes that it is difficult to find characters common to both. In the tables which follow I have, so far as possible, omitted all characters not shared by both sexes. The size of the eyes, the form of the hind tibia and a few other structural characters serve to distinguish a few small groups, but I have relied chiefly upon the character of the sculpture of the pronotum, which rarely differs in male and female and has much greater constancy than the structure of the head, largely employed for the purpose by others, although it is the part most subject to sexual dimorphism. Other features of especial importance are the exact shape of the front angles of the thorax, the shape of the 7th elytral stria, the presence or absence of a basal ridge upon the pygidium, etc. The ridges, horns and processes upon the head and prothorax so often found in one or both sexes naturally afford, when present, the best means of recognizing the species; but, besides being generally confined to one sex, they are always very variable, and may be highly developed or quite absent in specimens of the same sex of a species.

Extremely diverse types of thoracic sculpture occur within the genus, and although, as with almost every other feature, the transition from one type to another is very gradual, the separation by other characters of certain species has enabled fairly well defined categories to be established. One or two exceptional forms in which the sculpture is different in the two sexes will be found in two sections of the table.

The following species, although they have been catalogued as Indian, are not included here :—

Scarabæus ibex F. The original specimen of this was in Lee's collection, and should now be in the Hope Department of the Oxford Museum, but I have been unable to find it. The description is too slight for its recognition.

Scarabæus orientalis F., Ent. Syst. i, 1792, p. 52. The type should be in the British Museum, but has disappeared. The species has been considered to be a *Copris*, but it is said to be one-third of the size of *Copris lunaris*, and may perhaps be an *Onthophagus*. The thorax has two slight tubercles in front.

Copris vitulus F. (=*O. fabricianus* Goid., *O. fabricii* d'Orb.) is a South African species later named *immundus* by Boheman. Fabricius mistakenly attributed it to Tranquebar.

Scarabæus limbatus Herbst, Natursyst. Käfer, ii, 1789, p. 207, pl. 14, fig. 11. The habitat of Herbst's insect is unknown, but M. Boucomont has recorded *O. limbatus* from Tonkin and the Malay Archipelago.

O. lamellatus Bouc. (=*laminatus* Tasch.). This is a Chinese insect, and I know of no reason for including it in the Indian fauna.

Key to the Groups of Onthophagus.

1 (2)	Eyes large (seen from above), separated by distinctly less than three times their length	Group 1 (*hystrix*), [p. 163.
2 (1)	Eyes small (seen from above), separated by at least three times their length.	
3 (4)	2nd joint of hind tarsus only ½ as long as 1st joint	Group 2 (*crassicollis*), [p. 170.
4 (3)	2nd joint of hind tarsus ½ as long as 1st joint, or longer.	
5 (6)	Hind tibia extremely short, triangular, as broad at the end as the metatarsus is long	Group 3 (*lævis*), p. 171.
6 (5)	Hind tibia not extremely short, not as broad at the end as the metatarsus is long.	
7 (8)	Extremity of the hind (and middle) tibia produced into three lobes externally	Group 4 (*imperator*), [p. 174.
8 (7)	Extremity of the hind (and middle) tibia straight or nearly straight.	
9 (30)	Pronotum wholly or partly granular or rugose.	
10 (13)	Pronotum entirely granular or rugose, without distinct punctures.	
11 (12)	Upper surface clothed with very dense pile	Group 5 (*tarandus*), [p. 180.
12 (11)	Upper surface not clothed with very dense pile	Group 6 (*rudis*), [p. 184.
13 (10)	Pronotum partly granular or rugose, with some punctures (or smooth areas).	
14 (29)	Clypeal margin not tridentate.	
15 (16)	Base of pronotum strongly produced in the middle....................	Group 7 (*pactolus*), [p. 203.
16 (15)	Base of pronotum not strongly produced in the middle.	
17 (18)	Pronotum with granules evenly distributed throughout	Group 8 (*variegatus*), [p. 204.
18 (17)	Pronotum without evenly distributed granules throughout.	
19 (22)	Front angles of pronotum not produced, very blunt.	
20 (21)	Metasternum not pointed in front ...	Group 9 (*orientalis*), [p. 209.
21 (20)	Metasternum pointed in front	Group 10 (*sternalis*), [p. 222.
22 (19)	Front angles of pronotum more or less produced.	
23 (24)	Pronotum abruptly flattened at the hind angles	Group 11 (*rugulosus*), [p. 227.
24 (23)	Pronotum not abruptly flattened at the hind angles.	
25 (26)	Elytra more or less opaque	Group 12 (*catta*), [p. 229.
26 (25)	Elytra very shining.	
27 (28)	Pygidium clothed with very short setæ	Group 13 (*marginalis*), [p. 247.

28 (27) Pygidium clothed with long hairs.... Group 14 (*militaris*), [p. 252.
29 (14) Clypeal margin tridentate .... Group 15 (*discedens*), [p. 259.
30 (9) *Pronotum punctured, without granules, asperities, or rugosity.*
31 (32) Metasternum with angular process in front .... Group 16 (*quæstus*), [p. 260.
32 (31) Metasternum without angular process in front.
33 (34) 7th elytral stria indistinct .... Group 17 (*amphicoma*), [p. 262.
34 (33) 7th elytral stria distinct.
35 (36) *7th elytral stria straight and parallel with the 6th stria* .... Group 18 (*gemma*), [p. 263.
36 (35) 7th elytral stria more strongly curved than the 6th.
37 (38) Front tibia with three external teeth .... Group 19 (*heterorhinus*), p. 269.
38 (37) *Front tibia with four external teeth.*
39 (40) Punctures of pronotum large, close, umbilicate .... Group 20 (*falcifer*), [p. 270.
40 (39) Punctures of pronotum not large, close, umbilicate.
41 (44) Upper surface without hair, smooth, or with only very minute, scanty, and inconspicuous setæ.
42 (43) Pronotum shining, with the sides opaque .... Group 21 (*gagates*), [p. 277.
43 (42) Pronotum not shining, with the sides opaque .... Group 22 (*dama*), [p. 279.
44 (41) Upper surface distinctly hairy or setose.
45 (46) Pronotum pale at the sides .... Group 23 (*fasciatus*), [p. 310.
46 (45) Pronotum uniformly coloured.
47 (48) Pygidium without a basal ridge...... Group 24 (*pusillus*), [p. 321.
48 (47) *Pygidium with a basal ridge* .... Group 25 (*mopsus*), [p.327.

Key to Group 1 (hystrix *group*).

1 (8) Clothed with long erect hair above.
2 (7) Pronotum finely and closely punctured.
3 (6) Front tibia bearing only three external teeth.
4 (5) Vertex without horn or ridge .... *hystrix* Bouc., p. 164.
5 (4) Vertex with horn (♂) or ridge (♀) ... *vigilans* Bouc., p. 165.
6 (3) Front tibia bearing four external teeth .... *gulo*, sp. n., p. 164.
7 (2) Pronotum strongly, not closely, punctured.......................... *cavia Bouc.*, p. 166.
8 (1) Clothed above with short inconspicuous setæ.
9 (12) Pronotum evenly punctured.
10 (11) Pronotum moderately closely punctured.......................... *ochreatus* d'Orb., [p. 167.
11 (10) Pronotum very sparsely punctured... *incertus* d'Orb., p. 168.
12 (9) Pronotum bearing only a few irregularly scattered punctures .... *oculatus*, sp. n., p. 168.

110. **Onthophagus hystrix.**

Onthophagus hystrix Bouc.,* Ann. Mus. Civ. Genova, lxvi, 1914, p. 238.

Reddish-chocolate, rather shining, with the antennæ yellow, and fairly closely clothed above and beneath with rather long erect pale hairs.

Broadly oval, not very convex. The *head* is rather large, but not very dilated laterally before the eyes, which are large, as seen from above, and separated by less than three times the length of each. The *clypeus* is coarsely and rugosely punctured, feebly emarginate in front, separated by a fine curved carina from the forehead, which is sparingly punctured. There is a pair of minute transversely placed tubercles between the eyes. The *pronotum* is closely and moderately finely punctured, a little less closely in the middle. The front angles are acutely produced, the sides straight in front, nearly straight behind, the base rounded. The *elytra* are finely striate, the intervals flat and minutely asperately punctured. The *pygidium* is strongly and sometimes rugosely punctured. The *metasternum* is finely punctured except along the middle line, a little more strongly at the sides. The front tibia is armed with three strong teeth and extremely finely serrate above them, and the middle and hind tarsi are rather slender.

The two sexes are alike.

Length, 3–5·5 mm. : breadth, 2–3·5 mm.

Bihar : Pusa (*T. B. Fletcher*, Feb., June, July, Aug., Sept.); Chapra (*Mackenzie*). U. Prov. : Dehra Dun (*M. Bose*, July); Fyzabad (*R. W. G. Hingston*). C. Prov. : Baihar, Balaghat Dist. (*B. M. Bhatia*, May, June); Motinala R., S. Mandla (*N. C. Chatterjee*, June); Nagpur, 1000 ft. (*E. A. D'Abreu*). Bombay : Belgaum (*H. E. Andrewes*). Madras : Chipurupalle, Vizagapatam District (*R. S. Patuck*); Coimbatore (*T. B. Fletcher*, June); Trichinopoly (*R. O. Jermyn*, Sept.–Nov.); Travancore. Ceylon : Colombo (Aug., Sept., Oct.); Dehiwala, W. Prov. (Aug.): Peradeniya (*E. E. Green*, June); Kotte (April, July, Aug., Oct., Dec.); Battaramulla, W. Prov. (*G. M. Henry*, Jan.–Mar.). Tenasserim : Victoria Point (*E. T. Atkinson*).

Type in M. Boucomont's collection.

Taken on rice at Pusa.

This is a very common species, attracted in numbers to light. It is peculiar for its long bristly hair, the large eyes, three-toothed front tibia, and the absence of any obvious sexual features.

111. **Onthophagus gulo, sp. n.**

Dark chocolate-brown or almost black, scarcely shining above, sometimes with an ill-defined reddish patch upon the shoulder

of each elytron, the antennæ bright yellow, the body above and beneath fairly closely clothed with rather long erect pale hairs.

Broadly oval and moderately convex. The eyes are large (separated by less than three times the length of each), and the *head* is not much dilated at the sides. The *clypeus* is finely and closely rugose, a little produced and feebly emarginate in front, separated by a strong curved carina from the forehead, which is rather finely punctured. There is a pair of strong tubercles or short transverse carinæ between the eyes. The *pronotum* is closely and moderately finely punctured, the front angles are acutely produced, the sides straight in front and very feebly sinuate behind, and the base rounded. The *elytra* are finely striate, the intervals feebly convex and finely asperately punctured. The *pygidium* is moderately punctured, the metasternal shield bears fine scattered punctures except along a narrow median line, and the sides of the *metasternum* are rather more strongly punctured. The front tibia bears four strong external teeth.

Length, 5–6 mm.; breadth, 3–3·5 mm.

C. PROV.: Sagoda, Purna, Buldana (*N. C. Chatterjee*, Mar., Aug., Sept.); Nagpur (*E. A. D'Abreu*). BOMBAY: Belgaum (*H. E. Andrewes*).

Type in the British Museum.

Closely related to *O. hystrix*, from which it is most easily distinguished by the four distinct external teeth upon the front tibia. It is generally a little larger than *hystrix*, the head is more strongly and closely punctured or rugose, the clypeus longer, and the eyes are not quite so broad. The two strong tubercles or short carinæ upon the vertex are also distinctive.

112. Onthophagus vigilans.

Onthophagus vigilans Bouc., Faune Ent. de l'Indoch., Scar. 1921, p. 38.

Black or very dark brown, shining, with the legs and antennæ, the front of the head, and a rather vague spot on each shoulder red, and fairly closely clothed above and beneath with long, erect, stiff yellowish hairs.

Broadly oval, compact, and convex. The *head* is fairly large, shining, very sparsely but coarsely punctured, with the eyes large (separated by less than twice their length), the sides strongly rounded, the clypeus truncate in front and slightly rugose. The *pronotum* is strongly and moderately closely punctured, with the front angles acutely produced, the sides are straight in front and behind, and the base is

evenly rounded. The *elytra* are very finely punctured, the intervals flat and finely asperate-punctate or granular in double rows. The *pygidium* is shining and strongly but rather sparsely punctured. The metasternal shield is very sparsely punctured in the middle and rather more closely at the sides, and the sides of the *metasternum* are rather strongly punctured. The front tibia is armed with three strong external teeth.

♂. The clypeus is a little longer than that of the female, and separated by a feeble curved carina from the forehead. The vertex bears a short triangular horn, rather broad and flat at the base, pointed at the apex, and directed obliquely backward.

♀ The clypeus is separated from the forehead by a strong curved carina and the vertex bears a sharp, erect, rectangular lamina.

Length, 5–5·5 mm. ; breadth, 3·5 mm.

BIHAR : Chapra (*Mackenzie*). INDO-CHINA.

Type in the British Museum.

O. vigilans has the closest resemblance to *O. hystrix*, from which it is distinguished by the armed vertex of the head.

113. **Onthophagus cavia.**

Onthophagus cavia Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 237.

Shining black or very deep red-black, with the head, legs, and mouth organs red and the club of the antenna yellow. There is a thin clothing of pale setæ, those of the upper surface erect, sparse, and inconspicuous.

Elongate-oval, compact, not very convex, the elytra rather long and the legs rather slender. The *head* is moderately wide, the eyes are very large, as seen from above, the sides of the head are angulate and the clypeal margin is strongly rounded. The *pronotum* is fairly strongly, but not at all closely, punctured. The front angles are blunt, the sides nearly straight in front and feebly sinuate behind, and the base strongly rounded. The *elytra* are fairly deeply striate, the intervals having deep but not very regular punctures on each side close to or continguous with the striæ. The *pygidium* bears a few very strong punctures. The *metasternum* bears a longitudinal groove and a few fine scattered punctures upon the shield and the sides are more strongly and closely punctured.

♂. The head is lightly and finely punctured, except upon the front part of the clypeus, where there are larger punctures intermixed.

♀. The clypeus is closely transversely rugose and separated

by a fine curved carina from the finely punctured forehead, which is limited behind by a nearly straight carina between the eyes.

Length, 5 mm. ; breadth, 3·5 mm.

BOMBAY. S. INDIA : Nilgiri Hills, 6000 ft. (*H. L. Andrewes*) ; Coonoor, Nilgiri Hills, 4500 ft. (*M. Maindron*, July) ; Nandidroog (*T. V. Campbell*).

Type in M. Boucomont's collection.

114. **Onthophagus ochreatus.**

Onthophagus ochreatus d'Orb.,* Ann. Soc. Ent. France, lxvi, 1897, p. 241 ; op cit., lxxxii, 1913, p. 433 ; l'Abeille, xxix, 1898, p. 208.

Rusty-red, with the head, except the clypeus, black, the upper surface, except the head, not very shining, clothed with very minute and fairly close yellow setæ.

Broadly oval, compact, and not very convex. The *head* is large, with large eyes, the transverse diameter of which is about a quarter of that of the space between them. The sides of the head are gently rounded, the *clypeus* is a little produced, rather roughly but sparsely granulate, the margin feebly excised in front. There is a curved carina separating the clypeus from the finely punctured forehead. The *pronotum* is finely and moderately closely punctured, the front angles are sharp, the sides nearly straight in front and feebly sinuate behind, and the base rounded. The *elytra* are finely striate, the 7th stria gently curved, the intervals almost flat, finely and fairly closely punctured. The *pygidium* is finely and rather sparingly punctured, subopaque at the base and shining at the apex. The *metasternum* bears small scattered punctures in the middle and at the sides.

♂. The head bears between the eyes a pair of short, stout, parallel horns, pointed at the end and inclined obliquely backward. The horns are often reduced to short, blunt tubercles. The clypeus is very feebly emarginate in front.

♀. There is a carina between the eyes, more or less interrupted in the middle.

Length, 5·5 mm. ; breadth, 3·5 mm.

SIND : Karachi (*M. Maindron*). CEYLON : Trincomalee (*C. F. S. Baker*, June ; *E. E. Green*, Nov.) ; Colombo (*G. M. Henry*, Sept., Nov.). ARABIA. NUBIA. SOMALILAND. SENEGAL. MOROCCO.

Type in the Paris Museum.

Specimens were found by Mr. Henry included in a dung-ball of *Scarabæus gangeticus*.

The occurrence of this Palæarctic species in Ceylon is remarkable, the nearest other known habitat being Karachi. It appears to be abundant in Ceylon, and the fact that it has

been taken at intervals of a good many years and in different localities shows that its presence is not due to recent importation. The Ceylon examples have the 4th tooth of the front tibia almost indistinguishable, and the two sexes are almost alike, a dozen specimens sent to me including no male in which the frontal tubercles are developed into distinct horns; but I have not been able to compare sufficient examples to show whether these differences are constant.

115. **Onthophagus incertus.**

Onthophagus incertus d'Orb.,* Ann. Soc. Ent. France, lxvi, 1897, p. 241; l'Abeille, xxix, 1898, p. 208.

Very dark chocolate-brown, with the clypeus, lower surface, legs and antennæ red, the upper surface shining and thinly clothed with fine yellowish setæ.

Oval, compact, and not very convex. The *head* is large, with the eyes large, as seen from above, and separated by less than three times their length, the *clypeus* produced and a little excised in front, and the sides of the head very gently rounded. The clypeus is sparingly punctured and separated by a gently curved carina from the scarcely punctured forehead. The *pronotum* is rather sparingly but evenly and not very finely punctured. The front angles are sharp, the sides straight in front and feebly sinuate behind, and the base is rounded. The *elytra* are finely striate, the intervals flat and finely and sparsely punctured. The *pygidium* is opaque, except at the apex, and bears only a few scattered punctures.

♂. The head bears a pair of very short conical processes between the eyes. The clypeus is feebly emarginate in front.

♀. The head bears a strong straight carina between the eyes. The clypeus is fairly deeply emarginate in front.

Length, 5 mm.; breadth, 3 mm.

SIND: Karachi (*M. Maindron*, Aug., Sept.).

Type in the Paris Museum.

I am indebted to M. Bénard for sending me original examples of both sexes of this species for description.

116. **Onthophagus oculatus**, sp. n.

Rusty-red, with the head and pronotum, except the clypeus and the sides of the pronotum, reddish-black and thinly clothed with fine yellowish hairs.

Oval and not very convex, the head and pronotum very shining. The *head* is large, the surface bearing only a few large scattered punctures, the upper portion of the eyes large and separated by about two and a half times their length, the sides of the head gently rounded, and the *clypeus* a little

produced and excised at the front margin and divided from the forehead by a strong, nearly straight carina. The *pronotum* bears strong, scattered punctures, the front angles are sharp, the sides straight in front and almost straight behind, and the base strongly rounded. The *elytra* are finely striate, the intervals nearly flat and finely and sparingly punctured. The *pygidium* bears only a few irregular punctures. The *metasternum* bears only extremely scattered fine punctures at the sides and upon the shield, of which the centre is entirely smooth.

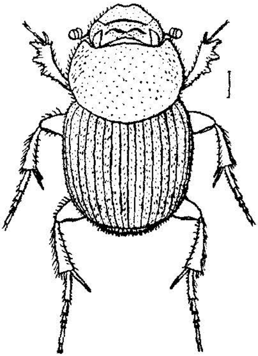

Fig. 14.—*Onthophagus oculatus.*

♂. The clypeus is rather feebly bilobed and the vertex of the head has a blunt prominence on each side between the eyes.

♀. The clypeus is rather more strongly bilobed, the carina separating the clypeus and forehead is stronger, and the vertex bears a strong, straight carina between the eyes.

Length, 4·5–6 mm. ; breadth, 3–3·5 mm.

S. INDIA : Malabar ; Pondicherry. CEYLON : Nilaveli (*C. F. S. Baker*, Sept) ; Colombo (*G. M. Henry*, Nov.).

Type in the British Museum.

This is very nearly related to *O. ochreatus*, and closely resembles it. The pronotum is much more thinly punctured, very shining, and darker in colour than that of *O. ochreatus*, and the remaining surface also is more sparsely punctured.

Group 2.

This contains only a single species.

117. Onthophagus crassicollis.

Onthophagus crassicollis Bouc.,* Ann. Soc. Ent. France, lxxxiii, 1914, p. 280.
Onthophagus nanus Lansb. (not Wat.), Notes Leyd. Mus. v, 1883, p. 67.

Black, shining, with the head coppery and the pronotum metallic green. The antennæ and mouth organs are yellow, and there is a clothing of pale setæ which are fairly close but very minute upon the upper surface.

Broadly oval, deeply waisted, and highly convex. The basal joint of the hind tarsus is long, and the second joint not more than a quarter as long as the preceding one. The *head* is not very broad, the *clypeus* is ogival, rounded in front, and the ocular lobes are strongly rounded externally. There

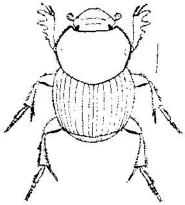

Fig. 15.—*Onthophagus crassicollis.*

is a short, straight carina between the eyes. The *pronotum* is evenly rounded and fairly strongly and closely punctured. The front angles are sharp, the lateral margins almost straight in front, feebly sinuate behind, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and fairly closely and not very finely punctured. The *pygidium* is strongly punctured, the metasternal shield sparsely but rather evenly and the sides of the *metasternum* rather more strongly and closely than the latter.

♂. The head is shining, unequally and not closely punctured, the clypeus not separated from the forehead.

♀. The clypeus is closely transversely rugose and separated by a feeble carina from the well-punctured forehead.

Length, 3·5–4·5 mm. ; breadth, 5–6 mm.

BURMA. MALAY PENINSULA. SUMATRA.

Type in M. Boucomont's collection; that of *nanus* Lansb. in the Leyden Museum.

Key to Group 3 (lævis *group*).

1 (4) Very smooth and shining, not very small.	
2 (3) Pronotum grooved, vertex bearing a median tubercle	*lævis*, Har., p. 171.
3 (2) Pronotum not grooved, vertex without a median tubercle.....................	*pacificus* Lansb., [p. 172.
4 (1) Hairy, rather minute	*cæsariatus* Bouc., [p. 173.

118. **Onthophagus lævis.**

Onthophagus lævis Har., Notes Leyd. Mus. 1880, p. 194; Bouc., Ann. Soc. Ent. Fr. 1914, p. 276.

Black, very smooth and shining, with the antennæ, mouth organs and setæ clothing the legs and lower surface yellowish.

Elongate-oval, convex, with stout legs, the hind tibia very broad at the extremity, the breadth equal to the length of the basal joint of the hind tarsus. The *head* is not very broad, the clypeal margin is broadly rounded and strongly reflexed, the sides of the head rounded and prominent in front of the eyes, the *clypeus* separated by a strongly curved carina from the forehead. which is very finely and sparingly punctured, and the posterior margin of the head produced obliquely backwards in the middle to form a short, curved, and pointed horn. The *pronotum* has a rather narrow and smooth excavation in front and a sharp angulation on each side of the excavation. It is strongly grooved upon its posterior half, lightly punctured dorsally, rather closely punctured laterally, and more or less rugosely near the front angles. The latter are bluntly rectangular, the sides are nearly straight in front and feebly sinuate behind, and the base rounded, with a slight tooth in the middle. The *elytra* are deeply striate, the striæ finely punctured, and the intervals rounded and very sparingly and minutely punctured. The *pygidium* is rather closely punctured, the sides of the *metasternum* are very closely punctured, and the shield is smooth and almost unpunctured in the middle.

♂. The clypeus is lightly punctured and shining.

♀. The clypeus is rather closely punctured and scarcely shining.

Length, 8–9·5 mm.; breadth, 5–6 mm.

BURMA. SUMATRA. BORNEO. JAVA. W. CHINA.

Var. **asiaticus** Bouc.

The dorsal groove of the pronotum is broad and shallow and strongly punctured, and the male is without a carina between the clypeus and forehead.

U. Prov.: Mussoorie (*H. Maxwell Lefroy*, Aug.). Bengal: Kurseong, Darjeeling Dist., 5000 ft. (*T. Bainbrigge Fletcher*, June).

Var. **stevensi**, var. n.

This differs from the typical phase of *O. lævis* in the smoother pronotum, devoid of punctures upon a large part of its surface, the sharper angulation on each side of the excavation, the unpunctured metasternal shield, and, in the female, the much more strongly rounded, nearly semicircular, clypeal carina and strongly rugose clypeus.

Sikkim: Gopaldhara, Rungbong Valley (*H. Stevens*).

If M. Boucomont is right in considering *asiaticus* Bouc. and *lampromelas* Fairm. as varieties of *Onthophagus lævis* Har., this species is a very variable and widely distributed but rather isolated form, with a number of local races.

119. **Onthophagus pacificus.**

Onthophagus pacificus Lansb., Notes Leyd. Mus. vii, 1885, p. 17.
Onthophagus pacificus var. *peguanus* Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 215.

Black, very smooth and shining, with the head, legs, antennæ and parts of the body beneath red, the pronotum frequently, and the metasternum and pygidium sometimes, suffused with a metallic lustre.

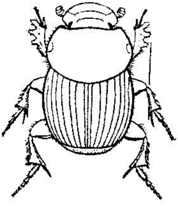

Fig. 16.—*Onthophagus pacificus.*

Oval, compact, and convex. The *head* is broad, the *clypeus* short, with its margin rounded, separated by a strong, curved carina from the well-punctured forehead, which is separated from the vertex by a similar but straight carina. The

pronotum is moderately punctured at the sides, very minutely in the middle. The front angle is almost rectangular, the lateral margin nearly straight in front and feebly sinuate behind, the hind angle very obtuse and the base rounded. The *elytra* are deeply striate, with ill-defined punctures in the striæ, the intervals rounded and minutely and irregularly punctured. The *pygidium* is very strongly punctured. The metasternal shield is very smooth in the middle, and the sides of the *metasternum* bear large but not numerous punctures. The middle and hind tibiæ are very broad at the extremity, not narrower than the length of the metatarsus.

♂. The clypeus is closely punctured.

♀. The clypeus is transversely rugose.

Length, 6–7·5 mm. ; breadth, 4–5 mm.

S. INDIA : Kanara (*T. R. D. Bell*) ; Nilgiri Hills (*H. L. Andrewes*). U. PROV. : Jhajra Range, Dehra Dun (*C. F. C. Beeson*, Nov.). ASSAM : Shillong (*M. Bose*, May). BENGAL : Sitapahar River, Chittagong Hill Tracts (*C. F. C. Beeson*, May). BURMA : Palon, Pegu (*L. Fea*, Sept.). INDO-CHINA. SIAM. MALAY PENINSULA. BORNEO. JAVA.

Type in the Leyden Museum ; that of *peguanus* in the Genoa Museum.

120. **Onthophagus cæsariatus.**

Onthophagus cæsariatus Bouc.,* Bull. Soc. Ent. France, 1921, p. 45.

Black, rather shining, with the pronotum dark metallic green or coppery, and with an orange spot upon the humeral prominence of each elytron, another in the inner basal angle, and a transverse apical patch extending almost from side to side.

Broadly oval, compact and convex, with a conspicuous clothing of moderately short, not very close grey setæ upon the upper surface. The *head* is closely granulate, with the clypeal margin uniformly rounded, nearly semicircular, and with a feebly curved, well-marked clypeal carina and a small, smooth, shining, posterior area, in front of which are two slight, oblique, cariniform elevations. The *pronotum* is rather strongly, uniformly, and moderately closely punctured, with a single row of similar but contiguous punctures at the basal margin, the front angles rounded and not produced, the hind angles obsolete, and the base finely margined and gently rounded, with an extremely obtuse angle in the middle. The *elytra* are finely but distinctly striate, with minute punctures in the striæ and rather sparse setigerous punctures in the intervals. The *pygidium* also bears rather sparse setigerous punctures. The *metasternum* bears a few rather scattered punctures at the sides and base, and is smooth in the middle. The legs

are short, the hind tibia broad at the end, and the hind metatarsus not longer than the breadth of the tibia.

♂. The teeth of the front tibia are set almost at right angles, and the extremity of the inner edge is produced into a downwardly bent tooth.

♀. The teeth of the front tibia are oblique and longer than in the male.

Length, 3·5 mm. ; breadth, 2 mm.

S. INDIA : Malabar.

Type in M. Boucomont's collection.

I have seen only the typical specimens, kindly lent to me by M. Boucomont.

In the shape of the front tibia of the male, although not of the female, this shows an approach to the genus *Caccobius*. The front edge of the tibia, even in the male, however, is not quite straight, but slightly sinuate.

Key to Group 4 (imperator *group*).

1	(6)	Head with paired horns in both sexes ; pronotum deeply excavated (♂) or bicarinate (♀).	
2	(3)	Elytra golden-red or golden-green....	*imperator* Cast., p. 174.
3	(2)	Elytra black or almost black.	
4	(5)	Elytral intervals punctured	*gladiator* Arr., p. 175.
5	(4)	Elytral intervals granular...........	*badeni* Har., p. 176.
6	(1)	Head without paired horns ; pronotum not deeply excavated nor carinate.	
7	(8)	Metasternum hollowed and very smooth behind	*digitatus* sp. n., p. 177.
8	(7)	Metasternum not hollowed, punctured behind.	[p. 178.
9	(10)	Upper surface closely and finely setose	*anguliceps* Bouc.,
10	(9)	Upper surface not closely and finely setose	*aviculus* sp. n., p. 179.

121. **Onthophagus imperator.** (Plate XIII, figs. 19, 20, 21, 22.)

Onthophagus imperator Cast., Hist. Nat. Col. ii, 1840, p. 84 ; Marcus, Arch. Nat. lxxxiii, 1919 (1917), A. 10, p. 63.

Onthophagus ellioti Cast., l. c.

Proagoderus imperator Marcus, Arch. f. Nat. lxxxiii, A. 10, 1917 (1919), p. 63.

Deep metallic green, with the elytra coppery-red, the sutural margins green, the antennal club bright yellow, and clothed beneath and upon the clypeus with yellow hair.

Oval, with the upper surface satiny and not very shining. The *clypeus* is granular, with the anterior margin a little produced, reflexed, and entire, limited behind by a strongly curved subangular carina, immediately behind which arises a pair of backwardly directed horns united at the base. The *pronotum* is long, more or less hollowed in front, unpunctured,

sparingly granular or quite smooth. The front angles are produced but rounded, and the base is produced in the middle and distinctly margined. The *elytra* are very finely and inconspicuously striate, with the intervals flat and minutely punctured. The *pygidium* is opaque and unequally but distinctly punctured, and the sides of the *metasternum* are closely punctured and hairy. The extremities of the middle and hind tibiæ are trilobed at the outer margin.

♂. The clypeus is not closely granular or hairy, and the front margin is very little produced. The frontal horns are slender, curved, minutely serrate behind the middle of their inner face, sharply pointed at the tip, and minutely toothed externally immediately before it. The anterior half of the pronotum is very deeply excavated, and the posterior margin of the excavation gives rise in the middle to a straight, strongly compressed, horn, directed obliquely forward and a very little dilated at the tip. The pronotum is entirely smooth, and bears only a few granules near the lateral angulation.

In males of minor development all three horns are shorter, and the dorsal one is strongly grooved above and not dilated at the end. In the smallest specimens the groove is wide and separates two bluntly prominent carinæ. The anterior excavation is slight and the cephalic horns are quite simple, neither serrate nor toothed before the end.

♀. The clypeus is closely granulate and setose and a little more produced. The frontal horns are flattened, not curved nor strongly divergent. Each has a median carina on its anterior face and is strongly bifurcate before the end, the outer branch longer than the inner. The sides of the pronotum are irregularly and rather sparingly granular, the anterior excavation is slight and its posterior border bears a pair of bluntly prominent carinæ.

Length, 14–20 mm.; breadth, 8·5–12 mm.

S. INDIA: Belgaum (*H. E. Andrewes*, June, July); Kanara (*T. R. D. Bell*); Nilgiri Hills (*G. F. Hampson*).

The two sexes of this extraordinary insect were, not unnaturally, given different names by their first describer. Mr. Andrewes took them together in abundance during the rains upon cow-dung which was being dried for flooring purposes. Marcus has suggested that the Siamese *O. mouhoti* Har. probably belongs to the same species, but this is not so.

122. **Onthophagus gladiator.** (Plate XIII, fig. 17.)

Onthophagus gladiator Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 418.

Coppery black, opaque above and shining beneath, with the antennæ and mouth organs yellow. The head is closely

clothed with recumbent pale setæ, and the sides of the body beneath are clothed with dark hair.

Broadly oval, not very convex. The *head* is rather broad, closely granular, with the ocular lobes rounded and the clypeus a little produced and rounded in front. The *pronotum* is smooth, with a few scattered granules at the sides. The front angles are produced but blunt, the sides nearly straight in front and behind, and the base is produced into a blunt angle in the middle. The *elytra* are very finely striate, with minute punctures in the striæ, the intervals flat and minutely punctured. The *pygidium* is finely and not closely punctured, the metasternal shield is smooth, and the sides of the *metasternum* are finely rugose. The middle and hind tibiæ are three-lobed at the end.

♂. The posterior part of the head is produced backward, forming a pair of very long and slender horns, united at the base, lying close to the back, not very strongly divergent, curved and convergent at the tips. They are compressed, finely serrate at the lower edge, and pointed at the end. The pronotum is deeply excavated, with the middle of the hinder edge of the excavation produced obliquely upward and forward as a long, straight, and strongly compressed horn, blunt at the tip.

The female is unknown.

Length, 18 mm. ; breadth, 11 mm.

INDIA.

Type in the British Museum.

Although recorded as India, the habitat is very likely Burma.

123. Onthophagus badeni.

Onthophagus badeni Har., Col. Hefte, xiv, 1875, p. 137.

Black and opaque, with the antennæ and mouth organs yellow, and clothed beneath with scanty dark hair.

Broadly oval and moderately convex. The *head* is not very broad, rugosely granular, with the ocular lobes gently rounded, the *clypeus* slightly produced and broadly rounded in front. The *pronotum* is very unevenly and unequally granular at the sides, the front angles are a little produced and truncate, the sides are feebly sinuate in front and behind, and the base forms an angular lobe in the middle. The *elytra* are extremely finely striate, with the intervals flat and finely granular. The *pygidium* is moderately punctured. The metasternal shield is smooth and the sides of the *metasternum* are rather finely rugose. The middle and hind tibiæ are trilobed at the extremity.

♂. The posterior part of the head bears a pair of extremely long slender horns, united at the base, directed backward and

outward, strongly curved and converging at the tips, which are minutely and unequally bifid. The inner edge of the horn is finely serrate. The pronotum is extremely deeply hollowed, the upper edge of the excavation produced forward and giving rise in the middle to a very long, straight, and nearly horizontal dorsal process, which is compressed, grooved, and rugose above and tapers to the end, which is feebly bilobed.

♀. The posterior part of the head bears a pair of rather long horns, united at the base, directed backward, rather narrowly divergent, flattened, and strongly, sharply, and unequally bifurcate towards the tips. The pronotum is a little flattened in front, and bears near the middle line on each side a triangular longitudinal lamina.

Length, 18–20 mm.; breadth, 11–13 mm.

ASSAM: Cachar.

Type in M. René Oberthür's collection.

124. **Onthophagus digitatus**, sp. n.

Black and partially opaque above, with the antennæ (except the club, which is black), mouth-organs, tarsi, and hairy clothing of the lower surface reddish. There is a thin clothing of fine, erect, dark setæ at the sides of the elytra in both sexes, and of the pronotum in the female.

Oval and not very convex. The *head* is very obtusely angulate at the sides, and the eyes are small but not very narrow. The front angles of the *pronotum* are not very sharp, the sides are nearly straight in front and feebly sinuate behind, and the base is distinctly angulate in the middle. The *elytra* are broadly striate, with the innermost intervals flat, opaque, and finely punctured and the lateral intervals rounded, very strongly punctured, and less opaque. The *pygidium* is coarsely and rugosely punctured and clothed with rather long, erect hairs. The metasternal shield is very smooth, with a posterior depression, and the sides of the *metasternum* are asperate in front and coarsely punctured behind. The hind tibia is very strongly dilated at the end and drawn out at its posterior edge into three finger-like lobes.

♂. The head is very smooth and unpunctured, with the front margin strongly reflexed and uniformly rounded, the clypeus not divided from the forehead, and the head between the eyes produced backwards into a short triangular horn. The pronotum also is smooth and unpunctured except at the sides, where there are a few large scattered punctures. The anterior part is triangularly excavated in the middle.

♀. The head is produced and rather sharply bilobed in front, the clypeus is coarsely rugose and divided by a slight carina from the forehead, which bears a few large punctures. The

pronotum is very coarsely punctured except on each side of the middle, where there is an irregular smooth area.

Length, 12 mm. ; breadth, 6·5 mm.

SIKKIM.

Type in the British Museum.

A specimen of each sex labelled "India borealis" was acquired with the Reiche collection. M. Boucomont has a male example from Sikkim.

The species is remarkable for the striking contrast between the very smooth head and prothorax of the male and the very strong puncturation of the same parts in the female. A different name was, not unnaturally, given to each sex by Reiche, although not published ; but the identity in most respects renders it practically certain that the differences are only sexual.

125. **Onthophagus anguliceps.** (Plate XIII, figs. 9, 10, 11.)

Onthophagus anguliceps Bouc.,* Ann. Mus. Civ. Genova, 1914, xlvi, p. 210.
Onthophagus blumei Bouc. (non Lansb.), Ann. Soc. Ent. Fr. 1914, p. 267.

Chocolate-brown or black, with the head and pronotum lightly coppery, the pronotum and elytra rather evenly clothed with minute yellowish hairs, and the pygidium and body beneath clothed (except in the middle) with longer and not closely set hairs.

Oval and not very convex. The *clypeus* is produced, and the ocular carinæ are produced backwards to the middle of the vertex. The *pronotum* is gently rounded, strongly and rather closely and evenly punctured, completely margined, with the front angles feebly produced and the base bluntly angulate in the middle. The *elytra* are finely but distinctly striate, with the intervals very finely and fairly closely punctured. The *pygidium* is strongly and not closely punctured, with a smooth median line. The middle and hind tibiæ are digitate at the extremities, and the hind metatarsus is toothed at the outer edge.

♂. The clypeus is very smooth and shining, the middle of the front edge produced into a bluntly pointed, rather abruptly reflexed finger-like process with a rectangular base, the angles of which are blunt. The sides of the head are straight and parallel, and curve gently upwards, and the vertex is produced backwards in the middle as a narrow flat process, curving upwards and truncate at the end. In small specimens the clypeal process is short and triangular, without a rectangular base, the sides of the head less parallel, and the posterior process short and not distinctly truncate. The anterior border of the pronotum is narrowly retuse, smooth, and shining. The

front tibia is long and narrow, with the external teeth separated and the inner apical angle produced into a long, narrow, finger-like process.

♀. The head is rugose, the clypeus closely and transversely; the anterior margin of the latter is narrowly excised; it is separated from the forehead by a short, curved carina, and the vertex is produced into a slightly elevated transverse process.

Length, 13–15 mm.; breadth, 8–9 mm.

BURMA: Karen Hills, Cheba, 2700–3300 ft. (*L. Fea*, Dec.). ASSAM: Garo Hills, above Tura, 3500–3900 ft. (*S. Kemp*, July, Aug., Sept.). MALAY PENINSULA.

Type in the Genoa Museum.

Onthophagus anguliceps bears a close resemblance to *O. blumei* Lansb. (Java), and its female was given that name by M. Boucomont in Ann. Soc. Ent. Fr. 1914, p. 267, Lansberge having previously mistaken his female type for a male. A male from Borneo, which M. Gillet has kindly sent me, of the Java species, differs in its black colour, less close puncturation, and less convex pronotum.

126. **Onthophagus aviculus**, sp. n. (Plate XIII, figs. 12, 13.)

Brownish-black, not very shining above, except upon the head of the male, sometimes with a very slight metallic lustre upon the head and pronotum. The antennæ and mouth-parts are yellow and the pygidium, lower surface, and legs are clothed with rather long yellowish hairs. There are a few stiff erect setæ upon the pronotum near the hind angles, and the elytra are clothed with minute and inconspicuous greyish setæ.

Oval, convex, and deeply waisted. The *head* is strongly reflexed in front and not very broad, with the sides gently rounded and the clypeus a little produced. The *pronotum* has fairly sharp front angles and very obtuse hind angles, near which there is a small perpendicularly flattened area containing a few large bristle-bearing punctures, and the base is distinctly angulate in the middle. The *elytra* are opaque and distinctly striate, and the intervals are slightly convex and fairly closely and finely punctured. The *pygidium* is strongly and irregularly punctured. The *metasternal* shield is very smooth in the middle, fairly strongly punctured near the sides and hind margin, and the sides of the *metasternum* are strongly punctured. The extremity of the hind tibia is produced into three lobes beneath.

♂. The head is very smooth and shining, feebly and minutely punctured, with the clypeus not sharply separated from the forehead, produced to a point in front, and the posterior margin of the head bluntly produced in the middle. The pronotum

is very minutely and rather sparsely punctured. The front tibia is rather elongate, with its inner edge produced into a strong spine at the extremity, and armed with four short external teeth.

♂ (major). The tip of the clypeus is very strongly produced and reflexed, the sides of the head are also strongly reflexed and bluntly produced, and the posterior margin bears in the middle a reflexed truncate horn. The pronotum is highly convex, and its lateral margins are abruptly contracted in front. The front legs are very long and the tibiæ very slender and strongly curved.

♀. The head is rather coarsely granular, the clypeus rather narrowly rounded in front and separated by a curved carina from the forehead. The pronotum is fairly strongly punctured, except in the hinder middle part, and the punctures become asperate at the sides.

Length, 12–17 mm. ; breadth, 6·5–9·5 mm.

BENGAL : Singla, Darjeeling Dist., 1500 ft. (June) ; Tukwar, Darjeeling Dist. (*F. A. Moller*) ; Tista Valley, Darjeeling Dist., 700 ft. (*J. C. M. Gardner*, Sept.). BURMA : Sumprabum, Putao Dist. (*B. Fischer*, June, July).

Type in the British Museum.

Specimens showing the characters of the male in full development are probably rare, for amongst a dozen of that sex only one (from Burma) has the thorax contracted in front and highly convex, and the posterior cephalic process strongly developed.

Key to Group 5 (tarandus *group*).

Elytral suture shining	*tarandus* F., p. 180.
Elytral suture not shining................	*dynastoides*, sp. n., p. 182.

127. **Onthophagus tarandus.**

Scarabœus tarandus F.,* Ent. Syst. i, 1792, p. 48.
Onthophagus biexcavatus d'Orb., l'Abeille, xxix, 1898, p. 204; Bouc., Ann. Mus. Civ. Genova, xlvi. 1914, p. 235.

Coppery or dark metallic green, with the elytra, except a dark sutural band narrowing behind, the femora, and antennæ bright yellow, the head and body beneath brown.

Oval, with the pronotum and elytra opaque, densely rugulose, and clothed with fine, rather close, recumbent yellow hairs, the pygidium and abdomen with long erect hairs. The *clypeus* is short and broad, transversely rugose, with the front margin very feebly excised ; the ocular lobes are roundly prominent ; the forehead is shining and bears a few punctures, and is enclosed between two curved carinæ, the posterior one stronger than the anterior. The vertex is very smooth and shining, and produced outward on each side into a sharp

pointed process, curving a little upward. The *pronotum* is very finely and closely granular, with its anterior border smooth and shining. There is a deep round excavation in this on each side, and the intervening space is produced forward as a horizontal process, bifid in front. At the outer edge of each excavation is a sharp forward process. The front angles are very bluntly rounded and the base scarcely angulate. The *elytra* are feebly striate, with the intervals finely and densely punctured. The *pygidium* is densely and more strongly punctured, without carina near the base. The *metasternum* is very smooth in the middle and rather strongly punctured at the sides.

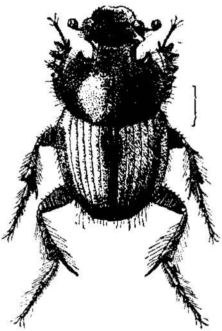

Fig. 17.—*Onthophagus tarandus.*

The two sexes are almost alike, but the clypeus of the male is slightly shining, and that of the female more closely rugose and opaque. The median thoracic process of the male is divided anteriorly into two sharper and more divergent lobes.

Length, 6·5–9 mm.; breadth, 4–5 mm.

U. PROV.: Dehra Dun (*C. F. C. Beeson*, July, Aug., Nov.; *Col. Harcourt*, Oct.). BOMBAY: Belgaum (*H. E. Andrewes*). BENGAL: Calcutta (*Miss Cleghorn*, Aug.); Berhampore (*E. T. Atkinson*). BIHAR: Pusa (*A. Murtaza*, July). C. INDIA: Jaithari Range, Umaria, Rewa Dist. (*C. F. C. Beeson*, Nov.); Baihar, Balaghat Dist. (June). S. INDIA: Nilgiri Hills (*H. L. Andrewes*).

Type in the Hope Department, Oxford University Museum.

A specimen sent to me from the Agricultural Institute at Pusa is labelled as taken in flowers of *Typhonium trilobatum*

in Calcutta, and the curious relation between the beetle and the flowers of this Aroid plant has been described by Miss Maude Cleghorn in Journ. Asiat. Soc. Bengal, x, 1914, p. 421. The peculiarly thick hairy clothing of *O. tarandus* appears to render it specially efficient as a pollen-carrier. About sundown the freshly opened flowers emit a strong carrion-like odour, which has a marked attraction for the beetle: this is therefore presumably a carrion-feeder. A few hours later the lobes of the spathe begin to wrap round the spadix at the constricted part, the odour ceases, and the beetles are completely imprisoned until the next night. "*On examining a spathe at sundown, when the strong unpleasant odour is being given off, it will be found that the narrow constricted part is open, forming a passage down into the lower chamber, where the pistillate and threadlike neuter flowers are concealed. . . . At this, the first stage, the stigmas are very sticky, and the strong carrion-like odour is given off from the pistillate flowers, but the staminate flowers will be found to be still immature, with no pollen shed. . . . On cutting open the tube of a spathe in the second stage, when the passage is tightly closed, a number of small brown Lamellicorn beetles (belonging to the dung-frequenting subfamily Coprini) will be found imprisoned inside. . . . It is clear that the floral mechanism of the spathe is of the nature of a trap, and by this ingenious method the plant ensures cross-pollination, for the beetles carry the pollen from one spathe to another. . . . The beetles remain among the pistillate flowers during their term of imprisonment in the second stage, but by the evening, when the spathe has re-opened in its third and last stage, the beetles are most anxious to make good their escape, and soon crawl up the mouth of the tube and up the lower staminate portion of the spadix, and so become covered with pollen before flying away, only to be deceived and recaptured by another spathe in the first stage. While among the pistillate flowers of the fresh spathe the pollen with which they are covered adheres to the sticky stigmas and thus cross-pollination is readily effected."

128. **Onthophagus dynastoides**, sp. n.

Black or greenish-black, shining beneath and opaque above, with the elytra (except the sutural and epipleural margins), antennæ and mouth-organs rust-red. The entire *surface is clothed with yellow hair, which is long and erect and* not very close upon the head, pygidium, and lower surface, and very fine, dense, and recumbent upon the pronotum and elytra.

Oval, rather elongate, moderately convex. The *head* is not broad, its sides are rounded in front of the eyes, which are not very small, and the clypeus is evenly rounded, its margin strongly reflexed. The *pronotum* is very minutely, densely, and confluently punctured. The front angles are very blunt, the sides obtusely angulate before the middle of the front part and lightly sinuate behind, and the base strongly rounded. The *elytra* are very finely striate, with the intervals flat. The *pygidium* is minutely and densely granulate. The *metasternum* bears moderately fine punctures, which are scattered and scanty on the shield and a little closer at the sides.

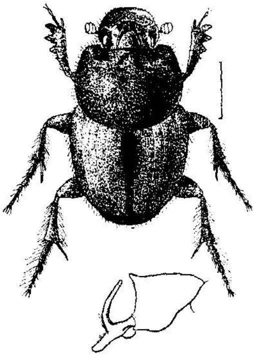

Fig. 18.—*Onthophagus dynastoides*, ♂, and side view of head and thorax.

♂. The clypeus is rather scantily asperately punctured and divided from the forehead by a curved carina, immediately behind which arises a rather broad transversely flattened horn, erect at the base, curving backwards, and strongly forked at the end. The pronotum is vertical and a little hollowed in front, and the upper edge of the declivity is produced obliquely forward and upward in the middle as a short blunt process, a little hollowed above.

The female is unknown.

Length, 11 mm.; breadth, 6 mm.

N. India.

Type in the British Museum.

I know only a single specimen of this very distinct species. It was formerly in the Reiche collection.

Key to Group 6 (rudis *group*).

1 (42) Opaque above; clypeus not bilobed.
2 (39) Granules of the pronotum closely packed.
3 (38) Pronotum without a pointed anterior process.
4 (21) Metasternum well and evenly punctured.
5 (12) Head rather narrow.
6 (7) Entirely dark above .... *rudis* Sharp, p. 185.
7 (6) Elytra pale, with black marks. [p. 185.
8 (9) Pronotum blue .... *cœruleicollis* Arrow,
9 (8) Pronotum metallic.
10 (11) Pronotum golden-red .... *regalis* Arrow, p. 186.
11 (10) Pronotum coppery................. *penicillatus* Har.,
12 (5) Head moderately broad. [p. 187.
13 (14) Elytra pale, punctured .... *jucundus*, sp. n., p. 188.
14 (13) Elytra dark, not punctured.
15 (18) Clypeus not pointed. [p. 188.
16 (17) Not uniformly coloured above ...... *gibbicollis* Lansb.,
17 (16) Uniformly bronzy above .... *pollicatus* Har., p. 189.
18 (15) Clypeus pointed.
19 (20) Granules of the pronotum smaller and more numerous .... *gangeticus* Gill., p. 190.
20 (19) Granules of the pronotum larger and less numerous .... [p. 191. *kanarensis*, sp. n.,
21 (4) Metasternum smooth, or almost smooth, in the middle.
22 (25) Head gently rounded at the sides. [p. 192.
23 (24) Pronotum opaque .... *griseosetosus*, sp. n.,
24 (23) Pronotum rather shining .... *bronzeus* Arrow, p. 192.
25 (22) Head very strongly rounded or angular at the sides.
26 (37) Head and pronotum black or dull metallic.
27 (30) Head with a strong clypeo-frontal carina.
28 (29) Clypeus very short .... *abacus* Bouc., p. 193.
29 (28) Clypeus a little produced .... *suillus*, sp. n., p. 194.
30 (27) Head without a clypeo-frontal carina.
31 (34) Head with a pointed posterior tubercle.
32 (33) Entirely black; elytra very feebly granular .... [p. 195. *amphinasus*, sp. n.,
33 (32) Not entirely black; elytra strongly granular .... [p. 196. *necrophagus*, sp. n.,
34 (31) Head without a pointed posterior tubercle.
35 (36) Head granular .... *gravis* Walk., p. 196.
36 (35) Head rugose .... *vultur*, sp. n., p. 197.
37 (26) Head and pronotum brilliant coppery-red .... *igneus* Vigors, p. 198.
38 (3) Pronotum with a pointed anterior process .... *tricornis* Wied., p. 198.
39 (2) Granules of the pronotum not closely packed (separated by more than their width).
40 (41) Granules of the pronotum evenly distributed .... [p. 199. *cryptogenus* Bouc.,

41 (40)	Granules of the pronotum not evenly distributed	*spinifex* F., ♀, p. 200.
42 (1)	Shining ; clypeus bilobed.	
43 (44)	Not hairy above ; elytra not spotted.	*bisectus*, sp. n., p. 201.
44 (43)	Hairy above ; elytra spotted	*coorgensis*, sp. n., p. 202.

129. **Onthophagus rudis.**

Onthophagus rudis Sharp, Col. Hefte, xiv, 1875, p. 58.
Onthophagus foveolatus Har., Ann. Mus. Civ. Genova, x, 1877, p. 68.

Dark greenish-brown or greenish-grey, slightly metallic, with the head golden-red or coppery, and the greater part of the surface above and beneath clothed with very fine recumbent yellowish or greyish setæ.

Oval, not broad, very convex, strongly constricted at the waist, shining beneath and opaque above. The *head* is closely and evenly rugulose, without transverse carinæ, flat, not broad, with the clypeus a little produced, blunt, and slightly reflexed in the middle. The *pronotum* is highly convex, densely covered with fine oval granules, with a small smooth pit on each side in front of the shoulder and a slight depression in the middle of the base. The front angles are very blunt, the lateral margins almost straight in front, bisinuate behind, the hind angles obsolete, the base produced backward and obtusely angular in the middle. The *elytra* are finely striate, with the intervals flat and closely covered with minute elongate granules. There is a very vaguely defined oblique roll crossing each elytron near the middle. The *pygidium* is fairly closely covered with fine granules. The metasternal shield is evenly and fairly strongly punctured and narrowed in front, where it is almost vertical. The sides of the *metasternum* are more strongly and closely punctured.

The sexes are alike.

Length, 6–7 mm. ; breadth, 3–4 mm.

BIHAR : Pusa (Sept.). ASSAM : Patkai Hills (*W. Doherty*). BURMA : Maymyo (*H. L. Andrewes*) ; Kawkareik (*L. Fea*, May). BORNEO. SUMATRA. JAVA.

Type in M. René Oberthür's collection ; also that of *foveolatus* Har.

130. **Onthophagus cœruleicollis.** (Plate I, fig. 9.)

Onthophagus cœruleicollis Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 430.

Blue-black and shining beneath, with the upper surface opaque, the head and pronotum deep blue or blue-green, the elytra bright yellow, with the suture and two transverse ranges of spots or patches black, the 1st before the middle, usually composed of four small spots on each side, the 2nd

behind the middle, forming an irregular band, sometimes disrupted. The antennæ and mouth-organs are bright yellow, and the body is clothed with yellow hairs and setæ, those of the upper surface minute but numerous.

Broadly oval and highly convex. The *head* is rather long and flat, the *clypeus* produced into a blunt reflexed lobe, the ocular lobes gently rounded, and the posterior part of the head almost semicircular. The *pronotum* is very convex and densely covered with fine oval granules, with a slight, smoother, oblique impression at the base on each side. The front angles are bluntly produced, the lateral margins a little sinuate both in front and behind, and the base is feebly produced in the middle. The *elytra* are finely striate, the intervals flat and finely granulate. The *pygidium* is strongly and closely punctured, the metasternal shield rather strongly and fairly closely, with its anterior edge vertical in the middle, and the sides of the *metasternum* moderately finely.

♂. The clypeus is densely punctured and the rest of the head closely granular. The front tibia is a little elongate, with the external teeth short and the terminal spur very short and blunt.

♀. The entire upper surface of the head is closely granular. The front tibia is broad and the terminal spur moderately long and pointed.

Length, 5–7 mm.; breadth, 4–5 mm.

BOMBAY: Belgaum (*H. E. Andrewes*); Dharwar.

Type in the British Museum.

131. **Onthophagus regalis.** (Plate 1, fig. 8.)

Onthophagus regalis Arrow,* Ann. Mag. Nat. Hist. (7) xix, 1907, p. 431.

Fiery coppery- or golden-red, with the pygidium, legs, and lower surface black or coppery-black and the elytra orange, with minute black spots on each, generally consisting of a transverse row of three just before the middle and a similar row just behind the middle, sometimes with also a spot behind the middle of the front margin and one or two near the suture between the two rows. There is a clothing of fine yellow hair above and beneath, and the mouth-organs and the footstalk of the antennæ are red and the club of the latter dark.

Oval, deeply waisted, and highly convex. The *head* is rather long and narrow, flat and closely sculptured, with the *clypeus* rather elliptical and the sides of the head very feebly rounded. The clypeus is separated by a rather indistinct line from the forehead. The *pronotum* is closely covered with small oval granules, and has a slight depression near the base on each side, in which the hairs are erect, and a slight

longitudinal depression at the middle of the base. The front angles are not very sharp, the lateral margins are nearly straight in front, rather strongly sinuate behind, and the base is rounded but a little produced in the middle. The *elytra* are very finely striate, the intervals flat, finely granulate and opaque. The *pygidium* is strongly and closely, almost rugosely, punctured. The lower surface, with the femora, is rather closely and moderately finely punctured, the posterior part of the *metasternum* rather less so, and its sides finely rugose. The anterior part of the metasternum is vertical and pointed.

♂. The head is rather rugosely punctured.

♀. The head is transversely rugose.

Length, 7–8·5 mm. ; breadth, 4·5–5 mm.

CEYLON : Maskeliya (*E. E. Green*, June, Aug., Nov.).

Type in the British Museum.

132. **Onthophagus penicillatus.**

Onthophagus pencillatus Har., Col. Hefte, xvi. 1879, p. 225.

Dark coppery or coppery-green, not shining, the elytra orange or rust-red, with the suture, a small spot close to the middle of the front margin of each, two irregular transverse bands, generally reduced to a few small spots upon the dorsal part, and a narrow apical bar, black. The antennæ and mouth-organs are yellow, and the body is rather closely clothed above and beneath with fine pale setæ, very minute upon the elytra.

Elongate-oval, very convex, and rather deeply waisted. The *head* is rather long, not broad, flat, and closely transversely rugose except upon the vertex, which is sparingly punctured. The *clypeus* is bluntly produced and a little reflexed at the tip, and the ocular lobes are moderately prominent laterally. The *pronotum* is densely covered with small oval granules and has a slight depression near the base on each side containing a pencil of erect hairs. The front angles are blunt, the lateral margins nearly straight in front, strongly sinuate behind, and the base obtusely angulate in the middle. The *elytra* are very finely striate, the intervals flat, opaque, and densely, rather finely, punctured. The *pygidium* is also very closely punctured. The *metasternum* is rather evenly punctured in the middle, and strongly and closely at the sides.

♂. The posterior margin of the head is produced into a short, upward-curving point in the middle, and the pronotum is a little hollowed in front.

♀. Unknown to me.°

Length, 9–11 mm. ; breadth, 5–7 mm.

Burma: Palon, Pegu (*L. Fea*, Sept.). Sikkim: Gopaldhara, Rungbong Valley (*H. Stevens*, June).

Type in M. René Oberthür's collection.

133. **Onthophagus jucundus**, sp. n.

Deep coppery or coppery-green, not shining above, the elytra yellow or rust-red, with the suture and outer margins, a small spot near the middle of the front margin of each, two irregular transverse rows of small spots, uniting in a large patch at the lateral margin, and a narrow apical bar, black. The antennæ, mouth-organs, and hairy clothing covering almost the whole body, but extremely fine upon the elytra, are yellow.

Elongate-oval, very convex. The *head* is closely granular, moderately broad, with the sides strongly rounded, the front margin reflexed and feebly truncate, the *clypeus* separated by a strongly curved carina from the forehead, and the posterior margin bearing a short erect tubercle in the middle. The *pronotum* is entirely and densely covered with fine granules, oval in shape except at the base, where they are almost round. There is a narrow median groove upon the posterior half, the front angles are blunt, the lateral margins feebly rounded in front and sinuate behind, and the base obtusely angulate in the middle. The *elytra* are very finely striate, with the intervals flat and closely and not very finely punctured. The *pygidium* is rather coarsely punctured, the metasternal shield is rather evenly punctured, except along the middle line, and the sides of the *metasternum* are strongly punctured.

Length, 10–11 mm.; breadth, 6 mm.

Assam: Manipur (*W. Doherty*). Burma: Momeik (*W. Doherty*).

Type in the British Museum.

This very closely resembles *O. penicillatus* Har., and its coloration and elytral pattern are almost the same. It differs in having the clypeus feebly truncate and not acuminate in front and the pronotum without the small shining area on each side. The fine hairy clothing is a little longer and more erect at the two points at which these areas occur in *O. penicillatus*, but there are no well-defined tufts as in that species. The pygidium is much more coarsely punctured than that of *O. penicillatus*.

134. **Onthophagus gibbicollis.**

Onthophagus gibbicollis Lansb.,* Ann. Mus. Civ. Genova (2), ii, 1885, p. 381.

Black, with the head and pronotum dark blue or blue-green and the outer margin of the head, the antennæ, tarsi, and elytral markings red, the last consisting of an irregular

basal border, from the shoulder almost to the suture, a small spot near the middle, but nearer the outer than the inner margin, a large spot just before the hind margin and near the suture, and a small elongate mark close to the last externally. The body is clothed above and beneath with very minute and inconspicuous pale setæ, most apparent upon the pygidium.

Broadly oval, very convex, opaque above and shining beneath. The *head* is rather broad, coarsely rugose, with the clypeal margin rounded and reflexed, the *clypeus* separated by a short, nearly straight carina from the forehead, and the hinder margin of the head gently curved upward, forming a straight lamina. The *pronotum* is closely covered with fairly large oval granules, with a feeble longitudinal median groove, the front angles are bluntly produced, the sides feebly sinuate behind the middle, and the base very obtusely angular in the middle. The *elytra* are very finely striate, with the intervals flat and covered with numerous, but not dense, moderately fine granules. The *pygidium* is closely covered with fine granules. The *metasternum* is vertical in front, strongly and rather evenly punctured in the middle, with a narrow, smooth, median line, and finely punctured at the sides.

♂. The pronotum has a round excavation on each side before the middle, and the surface between the two excavations is strongly elevated and produced outward on each side as a short pointed process.

Length, 6 mm. ; breadth, 4 mm.

Burma : Minhla (*Comotto*).

Type in the Genoa Museum.

135. Onthophagus pollicatus.

Onthophagus pollicatus Har.,* Col. Hefte, xvi, 1879, p. 226; Bouc., Vitalis, Faune Ent. de l'Indoch. iv, 1921, p. 43.

Bronzy-black, shining beneath and dull above, with the antennæ, mouth-organs, and a short, inconspicuous clothing of fine setæ, yellow.

Oval and very convex, with the waist moderately constricted. The *head* is subcircular, not large, with the clypeus rounded and divided from the forehead by a strongly curved carina. The posterior margin of the head bears a short, erect process in the middle. The *pronotum* is covered with closely packed, fine, elongate-oval granules, and bears two rounded tubercles placed not far apart just behind the front margin. The front angles are rather blunt, the lateral margins gently curved in front, bisinuate behind, the hind angles entirely obsolete, and the base is bluntly angular in the middle. The *elytra* are finely striate, with the intervals flat and rather closely

covered with minute granules, the 7th stria rather strongly curved. The *pygidium* is rather coarsely and deeply punctured, the *metasternum* strongly punctured, fairly closely upon the shield and a little less closely at the sides. The femora are strongly punctured.

♂. The head is shining, with the clypeus and forehead fairly strongly but not densely punctured, the sides a little rugose, and the posterior elevation forming a short pointed horn. The anterior part of the pronotum from the front margin to the tubercles is steep and slightly shining, with the granules rather scattered. The metasternum bears a rather deep, roundish excavation in the middle, a little in front of the hinder margin. The terminal tooth of the front tibia is short and set at right angles, the inner angle of the tibia is obliquely cut off, and the terminal spur is club-shaped.

♀. The head is transversely rugose and opaque, with the posterior elevation short and conical. The metasternum is flat. The terminal tooth of the front tibia is oblique, and the spur acutely pointed and strongly bent towards the end.

Length, 12 mm.; breadth, 7 mm.

BENGAL: Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, Oct.). ASSAM: Haflong, Cachar Dist. (*G. D. Bhasin*, May). BURMA: Ruby Mines (*W. Doherty*).

Type in M. René Oberthür's collection.

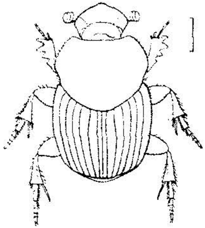

Fig. 19.—*Onthophagus gangeticus*.

136. **Onthophagus gangeticus.**

Onthophagus gangeticus Gill.,* Ann. Soc. Sci. Brux. xliv, 1925, p. 231.

Metallic bluish-green, shining beneath, moderately shining upon the head and pronotum, with the front border of the clypeus, the antennæ, mouth-organs, and tarsi red, and fairly closely clothed above with minute greyish setæ.

Elongate-oval, very convex, deeply waisted. The *head* is flat, densely rugose, with the clypeal margin angulate,

feebly produced and reflexed in the middle, and evenly rounded at the sides, the *clypeus* separated by a fine curved carina from the forehead, and the hind margin of the head bearing a short, straight carina in the middle. The *pronotum* is closely covered with small oval granules, the front angles are blunt, the lateral margins gently rounded in front, sinuate behind, and the base a little produced. The *elytra* are finely striate, the intervals flat and rather closely and minutely granular. The *pygidium* is strongly and very closely punctured. The metasternal shield is bluntly pointed and vertical in front and finely and evenly punctured, and the sides of the *metasternum* are closely asperately punctured. The legs are short, and the four posterior tibiæ are broadly dilated at the ends.

The two sexes are alike.

Length, 5–6 mm. ; breadth, 3·5–4 mm.

BIHAR : Pusa (Aug., Sept.) ; Chapra (*Mackenzie*). BENGAL : Calcutta.

Taken on grass at Pusa.

Type in Dr. Gillet's collection.

137. **Onthophagus kanarensis**, sp. n.

Black and shining, with the head bright coppery-red, the pronotum bright green, and the elytra suffused with green. The antennæ and mouth-organs are red, and the upper surface is almost devoid of hairs or setæ.

Oval, deeply waisted, and highly convex. The *head* is broad, subangulate at the sides, with the *clypeus* transversely rugose, the front margin very bluntly pointed in the middle, the forehead punctured, separated from the clypeus by a strong curved elevation, and the posterior margin of the head also bearing a strong elevation. The *pronotum* is covered with granules, large and very closely packed in the middle, smaller, narrower, and rather less close at the margins. The front angles are very blunt, the lateral margins nearly straight in front, sinuate behind, and the base strongly rounded. The *elytra* are striate, the intervals flat, with moderately fine irregular granules. The *pygidium* is rather strongly but not closely pnnctured, the metasternal shield sparingly but fairly evenly, and the sides of the *metasternum* rather strongly and closely.

The two sexes are alike.

Length, 5 mm. ; breadth, 3 mm.

BOMBAY : Talewadi, near Castle Rock, N. Kanara (*Dr. S. Kemp*, Oct.).

This differs from *O. gangeticus* by its brighter colouring and the larger and less numerous granules upon the pronotum and elytra.

138. **Onthophagus griseosetosus**, sp. n.

Brownish-black, very opaque above, sometimes with a very slight coppery lustre upon the head and pronotum, the lower surface greenish-black, the antennæ and mouth-organs reddish, the pygidium and lower surface clothed with short greyish hairs, and the upper surface evenly and moderately closely clothed with grey setæ.

Oval, fairly long, deeply waisted, and convex. The *head* is rather narrow, the eyes moderately large, the ocular lobes not dilated, feebly rounded externally, the *clypeus* a little produced, divided by a slight rounded carina from the forehead, with its front margin strongly reflexed and rounded. The *pronotum* is closely covered with fine oval granules. The front angles are produced and moderately sharp, the lateral margins nearly straight in front, feebly sinuate behind, and the base strongly rounded and obtusely angulate in the middle. The *elytra* are finely striate, the intervals flat, with numerous fine setigerous punctures. The *pygidium* is rather finely, not closely, punctured. The metasternal shield is strongly punctured at the sides, smooth in the middle, and the sides of the *metasternum* are finely punctured.

♂. The clypeus and forehead are fairly strongly and closely punctured, and the head is produced between the eyes into a short horn, oblique and triangular at the base, and sharply pointed at the tip. The front margin of the pronotum is rather smooth and a little hollowed. The spur of the front tibia is short and blunt. In small males the cephalic horn is represented only by a feeble tubercle, and the pronotum has no smooth margin.

♀. The head is densely rugose and bears a slight median tubercle between the eyes. The spur of the front tibia is long, acutely pointed, and abruptly bent at a right angle.

Length, 10·5–12·5 mm. ; breadth, 6–7 mm.

MADRAS : S. Mysore (*H. L. Andrewes*) ; Nilgiri Hills (*H. L. Andrewes*) ; Kanara (*T. R. D. Bell*). C. PROV. : Balaghat, Raigarh R. (*C. F. C. Beeson*, July). U. PROV. : Dehra Dun (June).

Type in the British Museum.

139. **Onthophagus bronzeus.**

Onthophagus bronzeus Arrow, Ann. Mag. Nat. Hist. (7), xix, 1907, p. 429.

Dark coppery or bronzy, scarcely shining, with the elytra opaque, dark brown, sometimes slightly bronzy at the margins. The antennæ and mouth-organs are yellow, and the body is clothed with yellow hair, very fine and inconspicuous upon the upper surface.

Broadly oval, very convex, deeply waisted. The *head* is flat, closely rugose, not very broad, with the ocular lobes gently rounded externally and the *clypeus* rounded, feebly produced, and separated by a slight, curved carina from the forehead. There is a slightly raised blunt tubercle in the middle of the posterior margin of the head. The *pronotum* is very convex and densely covered with fine oval granules, a little less densely packed at the sides. There is a pair of blunt tubercles just behind the front margin and placed not far apart in the middle. The front angles are rather sharply produced, the lateral margins are nearly straight in front and sinuate behind, the base finely margined and obtusely angulate in the middle. The *elytra* are extremely finely striate, with the intervals flat and very finely but numerously granulate. The *pygidium* is fairly strongly punctured. The metasternal shield is fairly strongly punctured at the sides and smooth in the middle, and the sides of the *metasternum* are strongly and closely punctured. The femora are strongly punctured beneath.

♂. The clypeus is rather rugosely punctured and scarcely produced. The cephalic tubercle forms a short horn in well developed specimens.

♀. The clypeus is a little more produced and transversely rugose. The cephalic tubercle is very feebly elevated.

Length, 10–12 mm.; breadth, 6–7·5 mm.

MADRAS: Nilgiri Hills (*G. F. Hampson*). BOMBAY: Castle Rock, N. Kanara Dist. (*S. Kemp*, Oct.).

Type in the British Museum.

140. **Onthophagus abacus.**

Onthophagus abacus Bouc.,* Bull. Soc. Ent. France, 1921, p. 44.

Dark metallic green or blue, with the elytra black and decorated with bright yellow markings, consisting of small basal spots, sometimes united, upon the 2nd, 4th, 6th, and 7th intervals, an irregular transverse median bar, sometimes interrupted and sometimes united with the basal patch, and an apical spot, sometimes united with the rest. The antennæ and mouth-organs are red.

Short, broad, and very highly convex, opaque above, with a clothing of fine, short, decumbent pale setæ, scanty upon the elytra. The *clypeus* is closely transversely rugose, with the margin rounded and strongly reflexed, separated by a nearly straight strongly elevated carina, as long as the interval separating the eyes, from the forehead, which is rugose but rather shining. The posterior margin of the head is produced backward and upward as a rounded carina. The *pronotum* is entirely covered with large, closely packed granules, some-

times with a smooth median line. The lateral margins are straight in front, sinuate behind, the front angles blunt, and the hind angles obliterated. The base is obtusely angulate in the middle. The *elytra* are very finely striate, with the intervals flat and irregularly covered with asperities. The *pygidium* is asperately punctured, closely at the base, and becoming less so towards the apex, where the punctures are simple. The metasternal shield is well punctured, pointed, and rather hairy in front, aud the sides of the *metasternum* are rugose.

♂. The pronotum bears a very slight tubercular elevation on each side, considerably before the middle, and about as far apart as the eyes. The spur of the front tibia is very blunt.

♀. The spur of the front tibia is longer, narrower, and rather sharp.

Length, 7·5–8 mm. ; breadth, 5 mm.

BENGAL : Raniganj (*A. Martin*, June). U. PROV. : Banki, Gorakhpur (*C. F. C Beeson*, Jan.). C. PROV. : Nagpur, 1000 ft. (*E. A. D'Abreu*, June). S. INDIA : Chatrapur, Ganjam District ; Mahé (*M. Maindron*) ; Koilpati, Tinnevelly Dist. (Oct.).

Type in M. Boucomont's collection.

The yellow markings are very inconstant. The type has them as described above, but other specimens in M. Boucomont's collection and the British Museum are entirely without them.

141. **Onthophagus suillus**, sp. n.

Deep greenish- or bluish-black, not very shining above, with the elytra dull black, bearing a small orange patch at the base of the 6th and 7th intervals, and clothed above and beneath with fine and not very close grey setæ. The antennæ and mouth-organs are reddish-yellow.

Broadly oval, compact, and very convex. The *head* is broad, bluntly angular at the sides, with the *clypeus* closely rugose, truncate in front, and separated by a strongly elevated, slightly curved, short carina from the forehead, which is lightly rugose. The *pronotum* is entirely and closely covered with short granules, not very fine, except at the sides and base. The front angles are slightly but not sharply produced, feebly rounded in front, gently sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the intervals flat and finely granular. The *pygidium* is finely asperate except at the apex, which is rather finely punctured. The *metasternum* is very finely and sparsely punctured in the middle, more strongly elsewhere, except at the outer margins, which are finely granulate.

♂. The clypeal carina is more strongly elevated and the hind

margin of the head is very feebly produced backwards. The pronotum is rather more elevated in the middle and more steep in front, and has a blunt tubercle on each side of the elevated part and a slight depression between the tubercle and the front angle.

Length, 6–6·5 mm. ; breadth, 4 mm.

S. MYSORE (*H. L. Andrewes*).

Type in the British Museum.

This resembles *O. abacus*, but is smaller, with a much longer clypeus, and has fine granules upon the elytra. The elytral pattern also is different.

142. **Onthophagus amphinasus**, sp. n.

Black, not shining, with the antennæ bright yellow, thinly clothed with yellowish hair beneath, with extremely minute and inconspicuous setæ upon the elytra. Small yellow spots are usually visible at the lateral margins of the 4th and 5th ventral sternites.

Oval, highly convex, and deeply waisted. The *head* is flat and densely rugosely granular, with the ocular lobes bluntly angular externally, and the *clypeus* produced in the middle into a minute, not very sharp, process. There is a small tubercle of somewhat similar size at the middle of the hind margin of the head. The *pronotum* is densely covered with fine granules, which become larger and more shining towards the middle and base. The front angles are very blunt, the sides feebly rounded in front and feebly sinuate behind, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and opaque, with minute scattered granules: the 7th stria is a little more strongly curved than the 6th. The *pygidium* is finely, densely, and rather confluently punctured. The *metasternum* is vertical in front and compressed to form a short process. The metasternal shield is very minutely and scantily punctured, and the sides of the metasternum are fairly strongly and closely punctured. The last ventral sternite is closely punctured.

The two sexes are alike externally.

Length, 9–11 mm. ; breadth, 5·5–7 mm.

S. INDIA: Nilgiri Hills; Talewadi, near Castle Rock, N. Kanara Dist. (*S. Kemp*, Oct.).

Type in the British Museum.

This species has an extremely close resemblance to *O. gravis* Walk. The tip of the clypeus is not merely sharply acuminate, as in that, but is produced into a short process, which is not quite acuminate. The posterior tubercle upon the head is also distinctive of the present species. The pronotum is a little less opaque than that of *O. gravis*.

143. **Onthophagus necrophagus**, sp. n.

Metallic green, not shining above (except sometimes upon the posterior part of the head and the anterior part of the pronotum, which may be coppery), with the elytra blue or bluish-green, and the antennæ, mouth-organs, and tarsi red. The upper surface is clothed with fine pale setæ.

Elongate-oval, deeply waisted, and highly convex. The *head* is fairly broad, closely transversely rugulose in front, and rugosely punctured behind, the *clypeus* produced to a rather sharp, but short, point, separated by a very feeble carina from the forehead, the sides of the head very strongly rounded in front of the eyes, and the posterior margin strongly produced or tuberculate in the middle. The *pronotum* is densely covered with oval granules, which change to a round shape near the base on each side. The front angles are very bluntly produced, the sides are nearly straight in front and feebly sinuate behind, and the base is very obtusely angular in the middle. The *elytra* are shallowly striate, the intervals flat and moderately closely and not very finely granular. The *pygidium* is rather strongly and closely punctured. The metasternal shield is bluntly angulate anteriorly, very feebly and sparsely punctured in the middle and a little more strongly at the sides, and the sides of the *metasternum* are fairly strongly punctured. The legs are short and stout.

♂. The hind margin of the head bears a short erect horn in the middle, the pronotum is hollowed behind the horn, and the spur of the front tibia is short and clubbed.

♀. The hind margin of the head bears a blunt tubercle in the middle, the pronotum is not hollowed, and the spur of the front tibia is long and slender.

Length, 6–8 mm. ; breadth, 4–5 mm.

U. PROV. : Nun Nadi, Dehra Dun (*M. Cameron*, July) ; Jhajra, Dehra Dun (*N. C. Chatterjee*, June).

Type in the British Museum.

Found in carrion and under dead leaves.

144. **Onthophagus gravis**.

Onthophagus gravis Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 208.
var. *nietneri* Har., Deutsche Ent. Zeits. xxiv, 1880, p. 350.

Dull sooty black above, occasionally (var. *nietneri*) with the head, pronotum, legs, and lower surface bright metallic green, golden-red, or coppery. The antennæ, mouth-organs and tarsi are red, and there is a clothing of whitish setæ, which are extremely minute and inconspicuous, upon the upper surface.

Oval, deeply waisted, and very convex. The *head* is flat,

closely rugose, strongly angulate at the sides, with the clypeus sharply angular in the middle and rounded at the sides. The *pronotum* is closely, finely, and evenly granular and strongly convex. The front angles are blunt, the lateral margins nearly straight in front, feebly sinuate behind, with the hind angles distinct and the base strongly rounded. The *elytra* are finely striate, with the intervals flat and very finely punctured. The *pygidium* is closely and deeply punctured. The *metasternum* is vertical in front, finely and rather closely punctured in the middle and finely rugose at the sides. The front tibia is broad, with strong teeth.

♂. The spur of the front tibia is rather broadly clubbed.

♀. The spur of the front tihia is rather slender and strongly curved.

Length, 8–10 mm. ; breadth, 5–6 mm.

CEYLON : Kandy (*G. E. Bryant*, June ; *E. E. Green*, July) ; Balangoda (*G. Lewis*, Mar.) ; Trincomalee Harbour (*E. E. Green*, Feb.) ; Wellawaya (*G. M. Henry*, Jan.) ; Urugala (*G. M. Henry*, April) ; Matale (*R. Senior-White*, May).

Type in the British Museum ; that of *nietneri* in M. René Oberthür's collection.

145. **Onthophagus vultur,** sp. n.

Black, opaque above, with the antennæ and mouth-organs red, clothed with extremely minute and inconspicuous setæ above, and with fairly thick white hair at the sides of the body beneath.

Broadly oval and very convex. The *head* is flat, closely punctate-rugose, with the sides bluntly angulate and the *clypeus* produced to a very obtuse but distinct angle in front. The clypeus is not divided from the forehead, which has a slight median depression, and there is a slight transverse elevation behind it. The *pronotum* is densely and evenly covered with fine elongate granules. The front angles are not very blunt, the sides are straight in front and sinuate behind, and the base is strongly rounded. The *elytra* are lightly striate and the intervals are flat and bear numerous minute granules. The *pygidium* is strongly and closely, partly confluently, punctured. The metasternal shield is rather strongly punctured except in the middle, where the punctures are fine, and the sides of the *metasternum* are strongly and closely punctured.

The sexes are alike.

Length, 8 mm. ; breadth, 4·5 mm.

BOMBAY : Belgaum (*H. E. Andrewes*) ; Igatpuri, 2000 ft. (*H. Maxwell Lefroy*, June).

Type in the British Museum.

Mr. Lefroy found this feeding upon dead locusts.

146. Onthophagus igneus. (Plate I, fig. 4.)

Onthophagus igneus Vigors,* Zool. Journ. i. 1825, p. 538, pl. 20, fig. 3.

Black, with the head (except the anterior part of the clypeus) and the pronotum fiery crimson, the pygidium deep blue or green, and the antennæ bright orange-yellow. The body is thinly clothed with yellowish hair beneath.

Broadly oval, deeply waisted, and very convex. The *head* is flat, rather coarsely rugose and strongly angulate on each side. The *pronotum* is very convex and closely and evenly covered with not very minute oval granules. The front angles are blunt, the lateral margins feebly sinuate in front and strongly behind, and the base is obtusely angular in the middle. The *elytra* are very finely striate, the intervals flat and very minutely granular. The *pygidium* is very strongly and closely punctured. The *metasternum* is produced into a bluntly prominent process in front; it is almost smooth in the middle, and fairly strongly punctured at the sides.

♂. The clypeus is a little produced in front, narrowed and gently reflexed in the middle, and the posterior margin of the head is produced to a point in the middle and curved gently upward. There is a small triangular excavation at the middle of the front margin of the pronotum. The club of the antenna is very large and broad.

♀. Unknown.

Length, 9·5–12 mm.: breadth, 6–7·5 mm.

S. India: Bangalore (*T. H. L. Grosvenor*, June; *C. F. C. Beeson*, Aug.): Anaimalai Hills (*H. L. Andrewes*); Yercaud, Salem District, Shevaroy Hills, 4600 ft. (*H. S. Pruthi*).

Type in the British Museum.

Dr. Beeson found this insect feeding upon a dead lizard. It is one of the most brilliant and beautiful of the Indian Coprinæ and no doubt has a peculiar mode of life, for all the fairly numerous specimens I have seen are males. The enlarged club of the antenna in this sex is highly exceptional and probably a further indication that the other sex has unusually retiring habits.

147. Onthophagus tricornis. (Plate XIII, fig. 18.)

Copris tricornis Wied.,* Zool. Mag. ii. 1, 1823, p. 10.
Onthophagus crassus Sharp, Col. Hefte, xiv, 1875, p. 51.

Black, not shining, with the antennæ and mouth-organs reddish, and clothed beneath with rather coarse reddish hair.

Oval, very convex, rather deeply waisted. The *head* is broad, the *clypeus* closely transversely rugose, with its front margin produced in the middle into a short, reflexed, not very sharp process. There is a very slight conical elevation in the middle of the head in front of the eyes, and the hind

margin of the head is produced backward as a broad plate, curving gently upward, very smooth, shining, and lightly punctured, its angles produced into a pair of short horns. The *pronotum* is covered with rather crowded oval granules, its anterior part produced in the middle a little behind the front margin into a pointed horizontal process, beneath and on each side of which the surface is a little hollowed, smooth, and shining. The front angles are blunt, the lateral margins nearly straight in front, strongly sinuate behind, and the base is obtusely angulate in the middle. The *elytra* are finely striate, the intervals flat, opaque, minutely asperately punctured dorsally, and strongly and rather closely at the sides. The *pygidium* is very strongly and closely punctured, the metasternal shield vertical in front and fairly well punctured, and the sides of the *metasternum* are closely rugosely punctured.

The two sexes are alike.

Length, 13–17·5 mm. ; breadth, 8–10 mm.

BIHAR : Chapra (*Mackenzie*). BURMA : Tharrawaddy (*G. Q. Corbett*) ; Moulmein (*L. Fea*, May). CAMBODIA. S. and C. CHINA. JAVA.

Type in the Copenhagen Museum ; that of *crassus* Sharp in M. René Oberthür's collection.

The name *tricornis* has been applied by Marcus, in Arch. für Nat. lxxxiii, 1917, p 64, to an *Onthophagus* from Bengal to which it evidently does not beloug.

148. **Onthophagus cryptogenus.**

Onthophagus cryptogenus Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 216.

Black, shining beneath and subopaque above, with the pronotum dark blue, the antennæ yellow, and the body clothed above and beneath with pale setæ, which are short, erect, and fairly close upon the upper surface.

Elongate-oval and rather convex. The *head* is short and not very broad and is fairly closely studded with not very fine granules. The *clypeus* is evenly rounded and divided by a gently curved carina from the forehead, and there is a straight carina at the hind margin of the head. The *pronotum* is uniformly and fairly closely studded with rather fine granules. The front angles are blunt, the lateral margins feebly curved in front and sinuate behind, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and rather numerously and not very minutely granular. The *pygidium* is shining and fairly strongly and closely punctured. The metasternal shield bears rather fine scattered punctures, and the sides of the *metasternum* are asperately punctured.

Length, 5–5·5 mm. ; breadth, 3·5–4 mm.

CEYLON : Colombo (*G. M. Henry*, Sept.).

Found by Mr. Henry in a food-ball of *Scarabæus gangeticus*.

Type in M. Boucomont's collection ; co-types in the British Museum.

The two sexes of this species are practically identical.

149. **Onthophagus spinifex.** (Fig. 3, *a*, *b*, *c*.)

Scarabæus spinifex F.,* Spec. Ins. i, 1781, p. 29.
Scarabæus spinifer Oliv., Ent. i, 3, 1789, p. 148, pl. 12, fig. 112.
Scarabæus æneus F.,* Spec. Ins. i, 1781, p. 34; Oliv., tom. cit. p. 131, pl. 14, figs. 128, *a* & *b*.
Copris spinifex F., Syst. El. i, 1801, p. 49.
Onthophagus reflexicornis Redt.,* Reise d. Novara, 1868, p. 57.

Dark blue, dark metallic or golden-green, with the legs and lower surface almost black, the antennæ, mouth-organs, and tarsi reddish, and clothed above and beneath with yellowish hairs and setæ.

Broadly oval and very convex. The *head* is rather broad, nearly semicircular, with the *clypeus* coarsely transversely rugose and separated from the forehead by an arcuate carina. The *pronotum* is moderately closely studded with small granules at the sides (in the ♂) or upon almost the whole surface (♀). The front angles are produced and rather sharp, the lateral margins are nearly straight in front and very feebly sinuate behind, the hind angles are obsolete, and the base is rounded and finely margined. The *elytra* are finely striate, the intervals flat, not shining, and finely and irregularly granular. The *pygidium* is rather strongly and closely punctured, with a fairly close clothing of decumbent hairs. The metasternal shield is rather strongly and evenly, but not closely, punctured, and the sides of the *metasternum* are fairly closely granular.

♂. The head bears a long slender horn, arising between the eyes, a little flattened in its basal part, curving gently backward and sometimes extending beyond the middle of the body. The pronotum is very smooth and shining in the middle and very slightly longitudinally grooved. The lateral granules change to asperate punctures nearer the middle, and these may change to simple punctures near the middle and base.

♂ (hornless phase). The cephalic horn is replaced by a transverse carina. The pronotum has a short steep declivity at the front margin and bears a pair of small tubercles rather close together at the top of the declivity. The granules of the sides change into asperate punctures upon the disc, which is not smooth except near the middle of the base.

♀. The head bears two strongly elevated curved carinæ, with the interval very smooth and sparsely punctured. The pronotum has a steep, smooth anterior declivity in the middle and a smooth hollow on each side, with a slightly elevated

prominence between the two hollows, a little depressed in the middle. The entire surface, except the front margin and lateral hollows, is covered with granules.

Length, 7·5–10 mm. : breadth, 4·5–6 mm.

BENGAL : Berhampore (*E. T. Atkinson*). BOMBAY : Poona (*E. T. Atkinson*) ; Belgaum (*H. E. Andrewes*). BIHAR : Pusa (*A. Murtaza*, June). S. INDIA : Nilgiri Hills (*H. L. Andrewes*) ; Kinavallore, S. Malabar (*P. S. Nathan*, Jan., Apr.) ; Chikballapur (*T. V. Campbell*) ; Madura (*T. R. D. Bell*). CEYLON : Colombo (*H. P. Green*, Nov. : *G. M. Henry*, Jan., July) ; Galle, coast-level (*G. Lewis*, Dec.) : Balangoda, 1776 ft. (*G. Lewis*, Mar.) Homagama, W. Prov. (*G. M. Henry*, Mar.) ; Dehiwala (*G. M. Henry*, Aug.) ; Kotte (*G. M. Henry*, Oct , Nov).

Types of *spinifex* and *æneus* in the British Museum ; that of *reflexicornis* in the Vienna Museum.

O. spinifex is a trimorphic species, as shown in the figures on p. 26. The hornless form of male is not a minor phase, and is apparently not connected by intermediates with the horned form. It approaches much nearer to the female form than to that of the normal male, but is distinct from either. The female has a rather strong anterior prominence upon the pronotum and a hollow on each side of it, the pseudo-female two tubercles at the edge of a declivity, and the horned male is entirely without declivity or prominence, the pronotum being a little flattened.

150. **Onthophagus bisectus**, sp. n.

Black, smooth, and shining, with the antennæ, mouth-parts, and sparse hairy clothing upon the lower surface reddish.

Elongate-oval, deeply waisted, and highly convex. The *head* is irregularly granular, with the clypeus transversely rugulose. The clypeal margin is obtusely notched in the middle and bluntly bilobed, the sides of the head are bluntly angular in front of the eyes, and the forehead bears a short conical tubercle between the eyes. The *pronotum* is closely covered with granules, which are roundish and moderately fine in front, becoming coarser, flatter, and more indistinct behind. There is a lightly impressed median longitudinal groove upon the posterior half. The front angles are very blunt, the sides feebly rounded in front and sinuate behind, and the base strongly rounded, with a very obtuse angle in the middle. The *elytra* are strongly striate, the intervals are slightly convex and minutely and rather sparingly punctured. The *pygidium* is closely punctured. The *metasternum* is longitudinally carinate in front, but does not form a process. The metasternal shield is finely and sparsely punctured, and the sides of the metasternum strongly and coarsely.

The sexes are alike.

Length, 9·5–11 mm. ; breadth, 5·5–6 mm.

S. India : Nilgiri Hills (*A. K. Weld Downing*) ; Snowdon Peak, 8000 ft. (*Y. R. Rao*, Sept.).

151. **Onthophagus coorgensis**, sp. n.

Black and shining, with the head and pronotum lightly coppery or metallic, and each elytron decorated with small pale yellow spots, viz., two at the base, one on the 4th interval, and one at the shoulder ; two near the suture, upon the 2nd and 3rd intervals, one just behind the base, the other close to the hind margin ; one just beyond the middle of the outer margin (sometimes upon three intervals), and one between the last two. The upper surface is clothed with fairly long, erect, yellowish hairs, and the antennæ (except the club), mouth-organs, and tarsi are red.

Oval, convex, and fairly compact. The *head* is a little produced in front and feebly notched in the middle of the front margin, rounded at the sides, and not very broad behind. The *clypeus* is coarsely punctured, the forehead coarsely but very sparsely. The *pronotum* is rather finely but not closely granular, the large spaces between the granules very uneven or undulated, and with a small smooth area in the middle of the back. The front angles are produced but not sharp, the lateral margins straight in front and feebly sinuate behind, and the base strongly rounded. The *elytra* are finely striate, and the intervals bear double rows of fine asperate punctures. The *pygidium* is fairly finely and sparsely punctured. The *metasternum* bears large punctures, which are very few and scattered upon the shield and rather more numerous at the sides.

♂. The head is coarsely and irregularly punctured, the clypeus not divided from the forehead and only feebly cleft in front. The head behind the eyes is produced backwards as a flat plate which divides into a pair of reclined horns, flat at the base, curving and convergent to the tips. The pronotum is smooth anteriorly, a little flattened on each side, and slightly tumid between the horns. The front tibiæ are a little elongate.

♀. The head is coarsely rugose, the clypeus divided by a curved carina from the forehead, and the posterior margin of the head sharply carinate.

Length, 5·5–6·5 mm. ; breadth, 3·5–4 mm.

S. India : Nilgiri Hills (*H. L. Andrewes*) ; Sappal, Palghat, Malabar Dist., 1700 ft. (*J. C. M. Gardner*, May).

Type in the British Museum.

Found in a rotten *Carica papaya* by Mr. Gardner.

This closely resembles *O. militaris* Bouc., but the sculpture of the pronotum is different, and the clypeus less sharply bidentate.

Group 7.

This is formed for a single species, *O. pactolus* F.

152. **Onthophagus pactolus.** (Plate I, fig. 11.)

Scarabæus pactolus F.,* Mant. Ins. i, 1787, p. 12.
Proagoderus pactolus Marcus, Arch. f. Nat. lxxxiii, A. 10, 1917 (1919), p. 65.

Rich deep metallic green, with the sides of the prothorax, and sometimes part of the head, reddish-golden, the elytra reddish-orange, with the suture green and the antennæ pale yellow. The head, legs, and lower surface are clothed with moderately long yellow hair, and the pronotum and elytra with minute yellow setæ.

Rather narrowly oval, convex, with the elytra, except the sutural margins, and in a less degree the middle of the pronotum, opaque. The *clypeal margin is entire and feebly reflexed.* The head, pronotum, and elytra are densely punctured or granular, the elytra very minutely and evenly, the pronotum smooth and shining at the middle of the front margin, sparingly granular in the front angles, and punctured, not very densely, upon the basal lobe. The *pronotum* is long, with the sides nearly straight, the front angles produced, and the base strongly lobed and flattened in the middle, with a slight apical depression. The *elytra* are feebly striate, with the juxtasutural interval carinate, the two carinæ meeting at the apex and diverging anteriorly. The *pygidium* is densely punctured and closely hairy at the base, moderately punctured and shining at the apex. The *metasternum* and femora are rather strongly punctured. The tibiæ are short and stout.

♂. The clypeus is semicircular, and the vertex bears a slender horn, erect at the base and curving backward a little at the tip, with a minute oblique tooth on each side near the middle. The pronotum bears a slight tubercle on each side above the retuse anterior part, which is produced backwards a little between them. The spur of the front tibia is nearly straight.

♀. The clypeus is a little produced but not pointed; there is a strongly arcuate frontal carina and a short straight one upon the vertex, inclined a little backwards and bearing a small erect tubercle at each end, and a rather longer process between them. The smooth vertical surface in the middle of the front of the pronotum is small and limited above by a short transverse carina on each side. The spur of the front tibia is bent inwards towards the end.

Length, 11–16 mm.; breadth, 7–10 mm.

U. Prov. : Dehra Dun (*O. C. Ollenbach* ; *M. Bose*, July) ; Fyzabad (*R. W. G. Hingston*) ; Bareilly (*C. Horne*). C. Prov. : Sagoda, Purna, Buldana (*N. C. Chatterjee*, Sept.). C. India : Mhow (*E. C. Selous*). Mysore : Bangalore (*E. Y. Watson*).
Type in the Glasgow Museum.

Key to Group 8 (variegatus *group*).

1 (8) Upper surface variegated.
2 (7) Pronotum not distinctly punctured.
3 (4) Elytra not very short .... *variegatus* F., p. 204.
4 (3) Elytra very short.
5 (6) Pronotum not spotted, its sides subangulate .... *furculus* F., p. 205.
6 (5) Pronotum black-spotted, its sides rounded .... *fuscopunctatus*, F., [p. 206.
7 (2) Pronotum closely asperately punctured. *troglodyta* Wied., p. 207.
8 (1) Upper surface uniformly dark .... *parvulus* F., p. 209.

153. **Onthophagus variegatus.**

Copris variegatus F., Ent. Syst. Suppl. 1798, p. 36.
Onthophagus variegatus d'Orb., Ann. Soc. Ent. France, lxxxii, 1913, p. 452.

Subopaque, with the head and lower surface shining. Deep yellow or rusty brown, with the head and lower surface

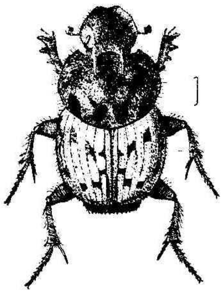

Fig. 20—*Onthophagus variegatus*, ♂.

dark and suffused with metallic lustre and the pronotum and elytra mottled with black markings and more or less metallic. The elytral striæ are generally dark, and two ill-defined transverse rows of small and sometimes partly confluent dark spots are generally traceable. The antennæ,

mouth-organs, femora, and pygidium are yellow, and the upper surface bears a fairly close clothing of very short pale setæ.

Oval and highly convex. The *head* is rather narrow, with the clypeus a little produced and notched in the middle and the ocular lobes gently rounded externally. The *pronotum* bears rather evenly and not very closely distributed fine granules. The front angles are acutely produced, the lateral margins are gently sinuate in front and behind, and the base is strongly rounded. The *elytra* are rather strongly striate, the striæ closely punctured, and the intervals slightly convex and very sparsely and minutely punctured. The *pygidium* is fairly strongly and closely punctured. The *metasternum* bears scattered punctures, those at the sides a little closer than those in the middle.

♂. The head is very smooth and shining, with fine scattered punctures. The clypeus is shallowly excised in front, and the posterior part of the head bears a pair of straight parallel horns, produced obliquely backwards, not very far apart, and united by a basal lamina. The front margin of the pronotum is steep, smooth, and shining.

♀. The clypeus is acutely notched and bidentate, rather rugosely punctured, separated by a strongly rounded carina from the finely punctured forehead, and there is a strong, straight, posterior carina.

Length, 4–5 mm. ; breadth, 2·5–3 mm.

PUNJAB : Lyallpur (July). SIND : Karachi (*M. Maindron*). ARABIA. EGYPT. SUDAN. ABYSSINIA. SOMALILAND. SENEGAL. ANGOLA. TANGANYIKA. PORTUGUESE E. AFRICA.

Type in the Copenhagen Museum.

154. **Onthophagus furculus.**

Copris furculus F.,* Ent. Syst. Suppl. 1798, p. 33.
Onthophagus furculus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 232.

Chocolate-brown, with the clypeus, antennæ, legs, and elytral markings red, the latter consisting of a small humeral spot at the base of the 6th and 7th intervals, a still smaller one at the base of the 7th interval, and sometimes a minute one at the base of the 2nd, a small transverse apical patch not quite reaching the suture, with a forward extension just within the outer margin almost reaching the middle of the elytron.

Rather broadly oval, very convex, not very shining, clothed with fairly close, short, greyish setæ, except upon the head. The *head* is very shining, deeply angularly notched in front, with the two resulting teeth sharply produced. The *pronotum*

bears numerous minute, rather evenly distributed but not closely set granules and a few shallow and rather large punctures near the base. The front angles are produced, the sides subangularly rounded in the middle and slightly sinuate behind, the base rounded and finely margined. The *elytra* bear wide shallow striæ, with the intervals flat and rather coriaceous, each with two series of fine asperate punctures, each bearing a short stiff seta. The *pygidium* and the lower surface are sparsely punctured and setose. The front tibia bears four sharp teeth.

♂. The clypeus is not separated from the forehead, and between and close to the eyes arise a pair of slender, but not long, straight horns, sloping a little backward and united by a basal carina, produced in the middle into a triangular lamina. The pronotum is nearly vertical and smooth and shining in front, with a slight median projection above.

♀. The clypeus is deeply and coarsely punctured, divided by a strongly rounded carina from the forehead, which is very shining and bears only a few fine punctures. The vertex bears a strongly elevated transverse carina.

Length, 4 mm.; breadth, 2·5 mm.

S. INDIA: Pondicherry (*M. Maindron*, June).

Type in the Copenhagen Museum.

155. **Onthopagus fuscopunctatus.**

Copris fuscopunctatus F.,* Ent. Syst. Suppl. 1798, p. 36.
Onthophagus fuscopunctatus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 236.

Shining ochreous yellow, with the head dark, the pronotum decorated with rather variable black spots, usually consisting of a transverse median row of four or six, two anterior to these, and three adjoining the basal margin, the spots sometimes more or less united together and the elytra also decorated with black spots, sometimes partly fused, sometimes consisting of two a little behind the base, two before the extremity, one near the shoulder, and one near the middle of the outer margin. The lower surface is also partly dark, the femora are yellow, the tibiæ and tarsi reddish, and the upper surface is sparingly clothed with yellow setæ.

Minute, oval, compact and not very convex, with fairly slender legs. The *head* is not very broad, shining, irregularly and not very closely granular, rounded at the sides and rather sharply bidentate in front. The *pronotum* is fairly numerously but not closely punctate-granular, the front angles are acute, the sides straight in front, almost straight behind, and the base gently rounded. The *elytra* are deeply striate, the 7th stria feebly curved, the striæ punctured, the intervals rather

convex and distinctly but sparingly punctured, most of the punctures forming double rows. The *pygidium* bears a few deep punctures, the *metasternum* bears a deep median groove and is fairly strongly but unevenly punctured, and the sides of the metasternum are very sparsely punctured.

The sexes are alike.

Length, 3–3·5 mm.; breadth, 2 mm.

S. INDIA: Madras City (*M. O. T. Iyengar*, June); Madura. CEYLON: Trincomalee (*E. E. Green*, Nov.).

Type in the Copenhagen Museum.

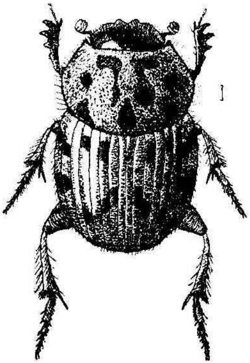

Fig. 21.—*Onthophagus fuscopunctatus*.

156. **Onthophagus troglodyta.**

Copris troglodyta Wied., Zool. Mag. ii, 1, 1823, p. 20.
Onthophagus spitiensis Gill.,* Ann. Soc. Sci. Brux. xliv, 1925, p. 235 (new syn.).

Black, with the elytra pale yellow, the suture and a zigzag transverse band crossing the middle but not quite reaching the outer margin, usually with a branch reaching the front margin at the middle, black. The antennal club is dark, with the footstalk, mouth-organs and tarsi red, and the upper surface is fairly closely clothed with short pale setæ.

Very short, convex, and globular. The *head* is short but not very broad, the ocular lobes not very prominent laterally, the *clypeus* a little emarginate in front. The *pronotum* is

strongly and fairly closely, but not densely, punctured, with minute interspersed granules. The front angles are produced and acute, the lateral margins feebly sinuate in front and behind, and the base strongly rounded. The *elytra* are rather deeply striate, the striæ closely punctured, the 7th stria nearly straight and parallel to the 6th, and the intervals slightly convex and minutely and sparsely granular, the granules generally forming two series. The *pygidium* is coarsely pitted. The metasternal shield is sparsely punctured, and the sides of the *metasternum* are shallowly and fairly closely punctured.

♂. The head is shining, the clypeus very feebly emarginate, coarsely punctured, the forehead finely and sparsely punctured, and the vertex is produced backwards and upwards as a flat,

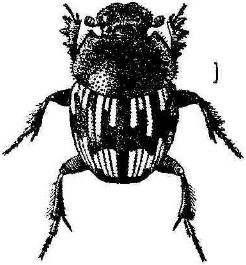

Fig. 22.—*Onthophagus troglodyta*, ♂.

not very broad plate, the angles of which are drawn into a pair of short, curving, and rather divergent horns. The front tibia is a little elongate, with four short external teeth.

♀. The clypeus is coarsely rugose, distinctly emarginate, and divided by a curved carina from the forehead, which is strongly punctured. The front tibia is short and its teeth are long.

Length, 4–4·5 mm.; breadth, 3 mm.

U. Prov.: R. Suswa, Dehra Dun (*C. F. C. Beeson*); Mohand Rau, Siwalik Hills (*M. Cameron*, Oct.).

Type in the Copenhagen Museum; that of *spitiensis* Gill. in Dr. J. J. Gillet's collection.

Dr. Kai Henriksen has kindly made a careful comparison of Wiedeman's type with specimens of *O. spitiensis* sent to him by me for that purpose.

157. **Onthophagus parvulus.**

Copris parvulus F.,* Ent. Syst. Suppl. 1798, p. 36.
Onthophagus parvulus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 218.
Onthophagus rugosiceps Mots.,* Bull. Mosc. xxxvi, 1863, 2, p. 458.

Black, slightly shining, with the antennæ, mouth-organs, and legs deep red, and uniformly and fairly closely clothed above with short grey setæ. The club of the antenna is black.

Minute, very broadly oval and compact, rather convex. The *head* is short, rather flat, and not very closely or minutely granulate, with the *clypeus* indistinctly separated from the forehead and rather feebly emarginate in the middle of the front margin, and the ocular lobes gently rounded and not much dilated externally. The *pronotum* is closely and uniformly covered with crescent-shaped shallow impressions or umbilicate punctures incomplete in front, the centre of each impression forming a minute granule. The front angles are a little produced or bluntly uncinate, the sides are almost straight in front and behind, and the base is rounded. The *elytra* bear strong double striæ, the seventh stria parallel to the sixth except near the end, the intervals are flat, and bear fairly closely set minute granules. The *pygidium* is strongly but not very closely punctured, and the *metasternum* bears deep scattered punctures, except at the sides, where the punctures are shallow and less scattered.

♂. The terminal tooth of the front tibia is truncate and rather rectangular.

Length, 3·5 mm.; breadth, 2 mm.

BOMBAY: Belgaum (*H. E. Andrewes*); Dharwar (*H. Swale*). S. INDIA: Madras City (*M. O. T. Iyengar*, June); Calicut. CEYLON: Colombo (*G. Lewis*, April; *G. M. Henry*, July, Aug.); Mt. Lavinia (*G. E. Bryant*, May); Homagama, W. Prov. (*G. M. Henry*, Mar.); Tala, S. Prov. (*T. Bainbrigge Fletcher*, Feb.).

From dung of wild buffalo (*T. Bainbrigge Fletcher*).

Type in the Copenhagen Museum; that of *rugosiceps* in the Moscow Museum.

This was apparently described by Fabricius from two specimens belonging to different species. That bearing the name *parvulus* F. is a female of *O. furculus* F. Beside it is an example of the present species, which, as the first does not agree with the description in coloration, I regard as the true type.

Key to Group 9 (orientalis *group*).

1 (26) Not extremely smooth and shining.
2 (19) Pronotum and elytra not entirely opaque.
3 (8) Elytra yellow.
4 (5) Elytra yellow, with black markings .. *pygmæus* Schall., p. 210.

5	(4)	Elytra yellow, without black markings.	
6	(7)	Pygidium clothed with long yellow hairs	*chrysurus*, sp. n., p. 211.
7	(6)	Pygidium clothed with short yellow hairs	*gratus*, sp. n., p. 212.
8	(3)	Elytra uniformly dark.	
9	(14)	Elytral intervals granular or asperately punctured.	
10	(11)	Elytra opaque dorsally, shining laterally	*sikkimensis* Gill., [p. 213.
11	(10)	Elytra entirely shining.	
12	(13)	♂, cephalic horns reclined; ♀, pronotum with two long carinæ in front	*orientalis* Har., p. 213.
13	(12)	♂, cephalic horns erect; ♀, pronotum with two short carinæ in front	*brutus*, sp. n., p. 215.
14	(9)	Elytral intervals not granular nor asperately punctured.	
15	(16)	Elytral intervals very convex	*castetsi* Lansb., p. 215.
16	(15)	Elytral intervals not very convex.	
17	(18)	Elytral intervals strongly punctured	*ænescens* Wied., p. 216.
18	(17)	Elytral intervals very lightly punctured	*ramosellus* Bates, [p. 217.
19	(2)	Pronotum and elytra entirely opaque.	
20	(23)	Pronotum rather strongly punctured.	
21	(22)	Clypeus sharply notched, bilobed	*metalliceps*, sp. n., [p. 218.
22	(21)	Clypeus not sharply notched, nor bilobed	*gibbosus* Scriba, p. 219.
23	(20)	Pronotum minutely punctured.	
24	(25)	Head not metallic	*tibetanus* Arrow, p. 220.
25	(24)	Head metallic	*cupreiceps* Arrow, p. 221.
26	(1)	Extremely smooth and shining	*brevicollis* Arrow, p. 221.

158. **Onthophagus pygmæus.** (Plate I, fig. 12.)

Scarabæus pygmæus Schall., Abh. Naturf. Ges. Halle, i, 1783, p. 239.
Onthophagus lucens Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 209.

Shining blue, green, coppery or golden, with the lower surface nearly black and the elytra bright yellow, the inner and outer margins, an irregular transverse bar crossing the suture beyond the middle, a spot behind the base in the middle, and another close to the middle of the outer margin, black. The body is clothed above and beneath with erect pale setæ.

Oval and convex. The *head* is not broad, the sides are rounded before the eyes, and the clypeus is bilobed in front. The *pronotum* is rather strongly and closely punctured in its basal part, the punctures changing to granules anteriorly. The front angles are rather sharp, the lateral margins nearly straight in front, sinuate behind, and the base is rounded. The *elytra* are finely striate, with the intervals flat and fairly strongly punctured. The *pygidium* is very strongly and closely punctured and clothed with rather long, close, outstanding

pale hairs. The metasternal shield is rather strongly but sparingly punctured, and the sides of the *metasternum* a little more closely.

♂. The head is very smooth and shining and bears only a few scattered punctures. The clypeus is a little produced, narrowed and strongly reflexed in front, and separated by a feeble curved carina from the forehead, and there is a strong, nearly straight carina behind the eyes. The anterior margin of the pronotum is very smooth and a little hollowed on each side, and the median dorsal part projects strongly and forms two blunt lobes in front. The front legs are very long, the tibia slender and feebly curved, with four very short and distant teeth, the uppermost only just indicated. The terminal spur is long and curved.

♀. The clypeus is short and coarsely rugose, separated from the feebly punctured forehead by a strongly curved carina, and there is a similar but straight carina behind the eyes. There is a broad, bituberculate prominence just behind the front margin. The front tibia is broad, with rather strong external teeth.

Length, 4–5 mm. ; breadth, 2·5–3 mm.

CEYLON : Colombo, coast-level (*G. Lewis*, April) ; Kandy (*G. E. Bryant*, June) ; Balangoda, 1776 ft. (*G. Lewis*, March) ; Niroddumunai, near Trincomalee (*E. E. Green*, Feb.) ; Homagama, W. Prov. (*G. M. Henry*, March) ; Rangala (*G. M. Henry*, April) ; Battaramulla, W. Prov. (*G. M. Henry*, March) ; Pidurutalagalla (*G. M. Henry*, July) ; Bintenne (*G. M. Henry*, Oct.) ; Koggala (*G. M. Henry*, Nov.) ; Suriyamar (*G. M. Henry*, Nov.). S. INDIA : Trivandrum (*E. T. Atkinson*, June) ; Kanakuth, Nilambur (*S. N. Chatterjee*, June) ; Bangalore (*C. F. C. Beeson*, Aug.).

Type ? in the Halle Museum ; that of *lucens* in the British *Museum*.

Found by Dr. Beeson in a dead lizard.

159. **Onthophagus chrysurus**, sp. n.

Coppery, with the lower surface, legs, and clypeus almost black, the elytra, antennæ, and a moderately close clothing of hairs, erect and not very short on the upper surface and long upon the pygidium, bright yellow.

Elongate-oval, deeply waisted, and very convex. The *head* is not very broad, its sides are rounded, and the *clypeus* is rounded in front and separated by a strong carina from the forehead. The *pronotum* is strongly and rather closely punctured, the punctures becoming rather less close at the sides and asperate or rugose in front. The front angles are very blunt, the sides nearly straight in front, strongly sinuate

behind, and the base strongly rounded. There is a well-marked *posterior median impression*. The *elytra* are finely striate and the intervals are nearly flat and bear numerous irregular setigerous granules or asperate punctures. The *pygidium* bears rather close asperate punctures and is without a basal carina. The metasternal shield is coarsely but sparingly punctured at the sides and smooth in the middle, and the sides of the *metasternum* are more strongly and closely punctured.

♂. *The clypeus is not very short, and bears only a few* scattered punctures. The forehead is very smooth, and the posterior margin of the head bears a pair of short, erect, and parallel sharp horns, united by a ridge which is slightly prominent in the middle. The pronotum is nearly vertical in the middle of the front margin, where there are two very slight blunt prominences.

♀. Unknown.

Length, 8 mm.; breadth, 4·5 mm.

ASSAM: Haflong, Cachar Dist. (*G. D. Bhasin*, May).

Type in the British Museum.

160. **Onthophagus gratus**, sp. n.

Black or blue-black, with the pronotum bright green or blue, the elytra (except the basal and sutural margins) orange-yellow, the tarsi and mouth-organs red, and the upper surface and pygidium fairly closely clothed with yellowish setæ.

Oval and not very convex. The *head* is short and moderately broad, with the sides rounded, the *clypeus* granular and evenly rounded, separated by a curved carina from the forehead, which is also granular, and the vertex bears a straight carina. The *pronotum* is strongly, evenly, and fairly closely asperate-punctate in the posterior part, the punctures replaced anteriorly by rather more closely set granules. The front angles are blunt, the lateral margins nearly straight in front and feebly sinuate behind, and the base rounded. The *elytra* are finely striate, the intervals flat and neither very finely nor very sparingly asperate-punctate or granular. The *pygidium* is rather strongly and closely punctured, the metasternal shield is finely and very sparsely punctured, and the sides of the *metasternum* rather strongly and closely.

The two sexes are alike.

Length, 4·5–5·5 mm.; breadth, 3–5 mm.

BIHAR: Ranchi (*W. H. Irvine*).

Type in the British Museum.

This is smaller than *O. chrysurus*, to which it is nearly related, and without the long and close yellow hairs upon the pygidium. The cephalic horns of the male are absent also, and the pronotum and elytra are less convex.

A specimen labelled "Ind. bor.," and originally in the Reiche Collection, has been for many years in the British Museum.

161. **Onthophagus sikkimensis.**

Onthophagus sikkimensis Gill.,* Ann. Soc. Sci. Brux. xliv, 1925, p. 234.

Black, opaque dorsally, and shining at the sides, with the head and the front of the pronotum sometimes feebly metallic, and clothed above and beneath with greyish setæ, fine and inconspicuous upon the upper surface.

Oblong-oval and very convex. The *head* is not very broad, strongly rounded at the sides, and evenly rounded at the front margin. The *pronotum* is strongly and rather closely punctured, rather less closely at the sides and asperately in the middle, with a short basal furrow. The front angles are moderately sharp, the sides straight in front and sinuate behind, and the base rounded. The *elytra* bear broad, shallow, unpunctured striæ, and the intervals are feebly convex, with fine, irregularly scattered granules. The *pygidium* is without a basal carina, fairly strongly and closely punctured and clothed, like the lower surface, with fairly long setæ. The metasternal shield has a smooth median line, the punctures are few, scattered, and fairly strong, and those of the sides similar and only a little more numerous.

♂. The clypeus is shining and bears large and small punctures intermixed, the forehead is similarly but more sparsely punctured, and not distinctly separated from the clypeus, and the vertex bears a short, stout, erect conical horn. The pronotum is vertical and shining at its anterior margin, with a few scattered punctures, and the upper edge of the vertical part has a short, transverse carina in the middle.

♀. The clypeus is closely rugose and separated by a strong rounded carina from the forehead, and there is a strong, straight carina between the eyes. The pronotum has a narrow, smooth, vertical front margin.

Length, 5·5–6·5 mm. ; breadth, 3 mm.

Bengal : Lopchu, Darjeeling Dist., 5000 ft. (*J. C. M. Gardner*, Sept.) ; Kurseong.

Type in Dr. J. J. Gillet's collection.

162. **Onthophagus orientalis.**

Onthophagus orientalis Har., Col. Hefte, iv, 1868, p. 83 ; Bouc., Vitalis, Faune Ent. de l'Indoch. iv, 1921, p. 54.

Black and shining, with the pronotum slightly coppery, greenish or bluish, the clypeus and legs more or less red, and the antennæ yellow. The greater part of the body above and

beneath is clothed, not very closely, except upon the pygidium, with short yellowish hair.

Oval and very convex. The *head* is not broad and the clypeal margin is strongly rounded. The *pronotum* is very convex, very strongly and deeply and rather closely punctured, except near the front margin, the punctures becoming asperate in front. There is a deep median longitudinal groove at the base. The front angles are blunt, the lateral margins feebly curved in front, strongly bisinuate behind, the hind angles distinct but obtuse, and the base finely margined and very obtusely angulate in the middle. The *elytra* are finely striate, the intervals a little rounded and irregularly, deeply, and not very finely punctured. The sutural region is rather deeply depressed, especially near the base. The *pygidium* is strongly and closely punctured and clothed with moderately long recumbent hair. The metasternal shield is strongly but not closely punctured, with a smooth median line, and the sides of the *metasternum* are densely punctured.

♂. The clypeus is shining, with a few punctures in the posterior part and very lightly strigose transversely in the anterior part. The forehead is divided from the clypeus by a fine, feebly elevated carina, and is very shining, with a very few punctures. The hinder margin of the head is produced backward, forming a pair of upward-curving, nearly parallel horns behind the eyes, united at the base by a lamina, which is a little elevated in the middle, forming a rectangular process. The pronotum is a little hollowed behind each horn, leaving a slight rounded prominence between.

♀. The clypeus is closely transversely strigose and not shining, except behind. It is separated by a very strongly elevated, nearly straight carina from the smooth forehead, and there is a similar parallel carina between the eyes. The anterior margin of the pronotum is nearly vertical, and the upper edge of the declivity forms a short but strongly marked straight carina on each side of the middle.

Length, 7·5–13 mm.; breadth, 4–7 mm.

U. PROV.: Dehra Dun (*O. C. Ollenbach*, July; *Col. Harcourt*, Oct.); Allahabad. C. PROV.: Raigarh R., Balaghat (*C. F. C. Beeson*, July). BIHAR: Pusa (*A. Murtaza*, June); Chapra (*Mackenzie*). SIKKIM: Mangpu (*E. T. Atkinson*). ASSAM: Manipur; Sadiya; Patkai Hills (*W. Doherty*); Nongpoh, Khasi Hills (*D. Nowrojee*, July); Shillong (*T. Bainbrigge Fletcher*, July). BENGAL: Sitapahar, Chittagong Hill Tracts (*C. F. C. Beeson*, May). BURMA: Maymyo (*H. L. Andrewes*); Rangoon (*L. Fea*, May); Palon, Pegu Div. (*L. Fea*, Sept.); Teinzo (*L. Fea*, May); Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.). ANDAMAN IS. (*Capt. Wimberley*). SIAM. MALAY PENINSULA. S. CHINA.

163. **Onthophagus brutus**, sp. n.

Black and shining, with a light metallic suffusion upon the head and pronotum, the antennæ yellow, the upper surface rather thinly, and the pygidium closely, clothed with short greyish or yellowish hair.

Rather broadly oval and very convex. The *head* is broad, with the sides rounded, the *clypeus* transversely rugose, the front margin uniformly rounded, the forehead bearing only a few punctures and separated by a straight carina from the clypeus. The *pronotum* is very strongly and rather closely punctured, except at the front margin, the punctures becoming asperate anteriorly. The front margin is nearly vertical in the middle, and the upper edge of the declivity bears a blunt prominence on each side of the middle. There is a well-marked longitudinal groove upon the posterior half. The front angles are blunt, the sides nearly straight in front and feebly sinuate behind, the hind angles distinct but obtuse, and the base finely margined and very bluntly angular in the middle. The *elytra* are strongly striate, the intervals a little rounded and very irregularly and not very finely asperately punctured. The suture is deeply impressed anteriorly. The *pygidium* is strongly and closely punctured and without a basal carina. The metasternal shield is strongly but sparingly punctured, with a smooth median line, and the sides of the *metasternum* more closely.

♂. The posterior cephalic carina is produced upward at each end, forming a pair of short, erect, parallel horns. The front tibiæ are slightly elongate.

♀. The posterior cephalic carina is toothed at each end and in the middle.

Length, 8 mm.; breadth, 4·5 mm.

BENGAL: Sarda (*F. W. Champion*). BURMA: Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.).

Type in the British Museum.

O. brutus is very closely related to *O. orientalis* Har., and almost identical in its form and sculpture, but the two sexes, instead of being very dissimilar, are closely alike. Both have a bituberculate prominence upon the pronotum, and the male has, like the female, an erect carina upon the forehead. The two ends of this are much more strongly produced in the male.

164. **Onthophagus castetsi.**

Onthophagus castetsi Lansb., Notes Leyd. Mus. ix, 1887, p. 163.

Black and shining, with the elytra opaque except at the outer margins, the upper surface without hair.

Broadly oval, with the thorax a little broader than the elytra, and armed, in both sexes, with a pair of horns upon the posterior part of the head and a pair of pointed tubercles, not far apart, upon the anterior part of the pronotum. The *head* is almost semicircular in shape, with the front edge of the *clypeus* slightly flattened in the middle and without transverse carinæ. The *pronotum* is very strongly and closely punctured, except in front, where it is retuse, with the two tubercles occupying the summit of the declivity. At the sides and near the base the punctures are confluent. The front angles are very blunt and the base strongly and evenly rounded. The *elytra* are deeply sulcate, with faint punctures in the sulci, the intervals strongly convex and finely punctured, at least at the sides. The *pygidium* is shining and strongly and fairly closely punctured. The metasternal shield is smooth in the middle, with its sides and those of the *metasternum* strongly punctured.

♂. The head is smooth, with faint and scanty punctures, except at the sides, and the clypeal margin strongly elevated. The horns curve outward and backward, except when very short, when they are parallel and vertical; when long they are angulate internally at a slight distance from the base.

♀. The clypeus and forehead are strongly transversely rugulose, and the horns are short, conical, and erect.

Length, 8–11 mm.; breadth, 5–6·5 mm.

S. India: Palni Hills, Kodaikanal, 6500–7500 ft. (*F. Gravely*, *T. Bainbrigge Fletcher*, May, June, Aug., Sept.); Palni Hills, 3000–6000 ft. (*P. S. Nathan*, May); Shembaganur, Madura (*P. du Breuil*); Trivandrum, Travancore (*E. T. Atkinson*).

Type in the Leyden Museum.

165. Onthophagus ænescens.

Copris ænescens Wied.,* Zool. Mag. ii, 1, 1823, p. 13.

Black, fairly shining, with a slight metallic-green or coppery lustre, the antennal club and mouth-organs yellow.

Broadly oval and moderately convex. The *head* is fairly broad, obtusely angular at the sides, with the *clypeus* divided from the forehead by a strong curved carina, its margin evenly rounded and reflexed, and with a pair of short, erect horns rising from the inner margins of the eyes and connected by a straight posterior carina. The *pronotum* is strongly and fairly closely punctured, the punctures becoming confluent in and near the front angles. The front angles are rather blunt, the lateral margins feebly curved in front and slightly sinuate behind, the base evenly rounded. The *elytra* are strongly striate, the 7th stria strongly curved, the intervals feebly convex and fairly strongly and closely punctured.

The *pygidium* is rather opaque, finely and sparingly punctured. The metasternal shield is finely and sparingly punctured, the sides of the *metasternum* rather strongly and asperately.

♂. The clypeus is short and closely punctured, the forehead rather long, strongly punctured, and separated from the clypeus by a semicircular carina continued backward to the bases of the horns The pronotum has a slight prominence just above the front margin in the middle.

♀. The clypeus is closely transversely rugose, and the forehead strongly punctured, short, and separated from the clypeus by a gently curved carina. The pronotum has a strong 2-cusped prominence just above the front margin in the middle.

Length, 10–13 mm. ; breadth, 6–7·5 mm.

SIND : Karachi. U. PROV. : Fyzabad (*W. H. G. Hingston*). BENGAL : Purneah Dist. ; Calcutta (*McClelland*). BIHAR : Pusa (*A. Murtaza*, June) ; Chapra (*Mackenzie*).

Found at Pusa " among Dabhi Rarki and Batri roots."

Type in the Hamburg Museum.

166. **Onthophagus ramosellus.**

Onthophagus ramosellus Bates,* Entom. xxiv, 1891, Suppl. p. 11.
Onthophagus capella Hope,* Gray's Zool. Misc. 1831, p. 22.

Black, opaque above, shining beneath, with the antennæ bright yellow.

Broadly oval, compact, and convex and almost without hairs or setæ above and beneath. The *head* is almost semicircular in outline, the *clypeus* and forehead closely transversely rugulose, and separated by a slight rounded carina. The forehead bears a very short, pointed process in the middle, and the vertex bears a pair of backwardly inclined horns. The *pronotum* is fairly strongly punctured (except the anterior lateral part in the male), entirely margined, with the front angles bluntly produced, the sides almost straight, and the base gently rounded. The *elytra* are strongly punctate-striate, with the intervals very minutely and sparsely punctured (a little more strongly at the sides). The *pygidium* is opaque and finely punctured. The *metasternum* has a strong median groove and is well punctured at the sides. The middle and hind femora have each a few setigerous punctures near the end.

♂. The clypeal margin is almost continuous in front. The horns are triangular in section, diverging a little from base to apex, nearly straight, and scarcely curved, but feebly bisinuate. The sides of the pronotum are a little depressed anteriorly from the front angles backwards, and smooth and shining in the depressed area.

♀. The clypeus is a little produced and its front margin slightly notched, the anterior carina and median tooth are

as in the male, but the horns are very short. The pronotum is not smooth nor depressed at the sides, but strongly punctured everywhere.

Length, 6·5–9 mm.; breadth, 4–5 mm.

N.W. FRONTIER PROV.: Taru, Peshawar Dist. (*T. Bainbrigge Fletcher*, May); Tarnab (*T. Bainbrigge Fletcher*, May). PUNJAB: Kulu (*G. Young*); Lyallpur (*G. R. Dutt*, July). U. PROV.: Fyzabad (*R. W. G. Hingston*); Suswa R., Dehra Dun (*C. F. C. Beeson*, Nov.); Ramgarh, Naini Tal, 6500 ft. (*C. F. C. Beeson*, May); Haldwani (*C. F. C. Beeson*, May); Jhajra, Dehra Dun (*C. F. C. Beeson*, Oct.). C. PROV.: Shahpur, Betul Dist., 2000 ft. (*E. A. D'Abreu*, Mar.); Hoshangabad, Narbada Bank, 1000 ft. (*E. A. D'Abreu*, Jan.); Nagpur, 1000 ft. (*E. A. D'Abreu*, July, Aug., Sept.). BIHAR: Pusa (*D. Nowrojee*, *A. Murtaza*, March, April, May, June, July, Aug., Sept., Oct.); Chapra (*Mackenzie*). BENGAL: Calcutta (*M. O. T. Iyengar*, Feb.); Hooghly Ghat (April); Rangpur (*H. Sirkar*, Aug.); Berhampore. ASSAM: Tejpur (*Desenne*). UPPER BURMA: Myingyan (*T. Bainbrigge Fletcher*, Aug.) S. INDIA: Bangalore (*C. F. C. Beeson*, Aug.).

A specimen was taken in a rotten *Papaya* stem at Pusa (May).

Type in M. René Oberthür's collection.; co-type in the British Museum; also the type of *capella* Hope. The latter name was pre-occupied by an Australian species.

167. **Onthophagus metalliceps**, sp. n.

Dull black, or deep blue-black, with the head, or its posterior part, bright metallic green and the lower surface and legs with a slight metallic suffusion. The upper and lower surfaces bear only extremely minute and inconspicuous setæ.

Oval and not very convex. The *head* is moderately broad, with the eyes rather large (seen from above), the *clypeus* a little produced, deeply notched and bilobed in front, separated by a strongly rounded carina from the forehead, which is strongly punctured. There is a conical elevation in the middle of the posterior margin of the head and a slighter elevation on each side at the inner margin of the eye. The *pronotum* bears large, shallow, umbilicate punctures, which become larger laterally and are crowded, disrupted, and confused at the sides. The front angles are blunt, the lateral margins gently rounded in front, feebly sinuate behind, and the base evenly rounded. The *elytra* are finely striate, with fine punctures in the striæ, the intervals flat and finely coriaceous. The *pygidium* bears only a few minute punctures, and the *metasternum* is very smooth and shining, with only a few fine punctures at the sides.

♂. The clypeus is closely and very strongly punctured. The terminal tooth of the front tibia is sharp and set at a right angle to its inner edge, and the tibial spur forms a very short and broad, rounded plate.

♀. The clypeus is rugose and bears a curved carina parallel to the frontal carina. The terminal tooth of the front tibia is oblique and blunt, and the tibial spur is long and curved.

Length, 7–8 mm.; breadth, 4·5–5 mm.

S. Bombay: Kanara (*T. R. D. Bell*).

Type in the British Museum.

168. **Onthophagus gibbosus.**

Copris gibbosus Scriba, Journal, i, 1790, p. 56; Beiträge, i, 1790, p. 33, pl. 4, fig. 3.

Onthophagus schnabeli Splichal, Deutsche Ent. Zeits. 1910, p. 567.

Black, opaque above, sometimes with a very faint metallic suffusion, the elytra rust-red, chocolate or black. The upper surface is almost devoid of hairs or setæ. The antennæ are entirely dark.

Broadly oval and not very convex. The *head* is short, the *clypeus* closely rugose, with its front margin straight in the middle, and separated by a straight carina from the forehead. The sides of the head are obtusely angulate. The *pronotum* is closely, unevenly, and unequally punctured, becoming rather rugose at the sides. The front angles are blunt, the sides feebly rounded in front and slightly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, with the intervals flat and finely and sparingly granular. The *pygidium* is opaque and finely and sparsely asperately punctured. The metasternal shield is strongly punctured, with a smooth median line, and the sides of the *metasternum* are more finely punctured. The terminal tooth of the front tibia is very short.

♂. The extremities of the clypeo-frontal carina are produced into a pair of short, erect, parallel horns, and the forehead is finely punctured and opaque. The pronotum has a steep declivity in front, the upper margin of which forms a bluntly triangular projection in the middle and a sharp tubercle on each side. The terminal tooth of the front tibia is set almost at right angles, and the spur is truncate at the end.

♀. The clypeo-frontal carina has a short erect process in the middle. The terminal tooth of the front tibia is very oblique and the spur is sharp-pointed.

Length, 9–11 mm.; breadth, 6–6·5 mm.

Himalayas: Sutlej R., Tibet-Indian Frontier. Turkestan. Persia. Asia Minor. E. Europe.

Type unknown; that of *schnabeli* in the collection of its describer.

169. **Onthophagus tibetanus.**

Onthophagus tibetanus Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 428.

Entirely black, including the antennæ and mouth-organs, opaque above and shining beneath, and clothed with dark setæ, which are very short and inconspicuous upon the upper surface.

Broadly oval and not very convex. The *head* is moderately dilated at the sides and the *clypeus* is more or less bilobed. The *pronotum* is very finely, unevenly, and not closely asperately punctured, the punctures changing to granules in the anterior part. The front angles are broadly rounded, the lateral margins strongly curved anteriorly, feebly behind, and the base finely margined and distinctly angular in the middle. The *elytra* are very finely striate, the 7th stria strongly curved, the intervals flat and minutely and sparingly granulate. The *pygidium* is opaque and bears a few minute punctures. The metasternal shield is strongly punctured, with a smooth median line, and the sides of the *metasternum* are finely and not closely punctured.

♂. The head is minutely and sparingly punctured, with a few large punctures on the clypeus. The clypeus is produced, narrow, bilobed and strongly reflexed in front and not distinctly separated from the forehead, and the posterior margin of the head is produced backward as a rectangular lamina, from the edge of which springs an upward-curving horn. The pronotum is a little hollowed, smooth and shining in front.

♀. The clypeus is transversely rugose, scarcely produced, but a little bilobed, and separated from the forehead by a strongly curved carina. The posterior margin of the head is produced upward in the middle as a small rectangular process. The front margin of the pronotum is narrowly vertical in the middle.

Length, 7·5–10 mm.; breadth, 4–6 mm.

Tibet: Chaksam, 12,000 ft., Brahmaputra Valley; Gyangtse, 13,000 ft. Kashmir: Killanmarg, 10,000 ft. (*T. Bainbrigge Fletcher*, July). U. Prov.: Dhauli Ganga Valley, Almora, 10,630 ft. (*R. N. Parker*, July).

Type in the British Museum.

O. tibetanus is exceedingly close to *O. concolor* and *O. cupreiceps*, but is easily distinguished from both by the uniform curvature of the sides of its prothorax, which completely rounds off the front angles. The upper surface is more opaque than that of *O. concolor*, but less so than that of *O. cupreiceps*. The sculpture of the pronotum is rougher than that of *O. concolor*.

170. **Onthophagus cupreiceps.**

Onthophagus cupreiceps Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 427.

Black, very opaque above, with the head and the anterior part of the pronotum shining and coppery, the lower surface and legs shining greenish-black. The antennæ are black. There is an inconspicuous clothing of dark setæ, which are extremely minute upon the upper surface.

Oval and not very convex. The *head* is moderately dilated at the sides, with the clypeal margin rounded but feebly excised in the middle. The *pronotum* is very finely and not closely asperately punctured in the basal part, the punctures changing to granules, more closely set in the anterior part. The anterior margin is steep, smooth, and shining. The front angles are bluntly produced, the lateral margins nearly straight in front, rounded behind, and the base very obtusely angulate in the middle. The *elytra* are finely striate, the intervals flat and extremely minutely and sparsely granulate. The *pygidium* is opaque and very minutely and sparsely punctured. The metasternal shield is sparingly but fairly strongly punctured, and the sides of the *metasternum* rather more finely and closely.

♂. The head is smooth, with only a few scattered punctures, and the clypeus is not separated from the forehead. The vertex is produced backward as a rectangular lamina, from the hinder edge of which springs an upward-curving horn.

♀. The clypeus is finely transversely rugose and separated by a rounded carina from the forehead. The vertex is produced upward as a short rectangular process.

Length, 8–10 mm.; breadth, 5–6 mm.

SIKKIM: Khamba Jong, 15,000–16,000 ft. (July); Tungu, Teesta Valley, 13,000–14,000 ft. TIBET.

Type in the British Museum.

171. **Onthophagus brevicollis.**

Onthophagus brevicollis Arrow, Ann. Mag. Nat. Hist. (7), xix, 1907, p. 422.

Black and very shining, with the antennæ, mouth-organs, and tarsi red, the lower surface bearing scanty pale setæ, and the upper surface entirely without clothing.

Very broadly oval and convex, with the prothorax distinctly broader than the elytra at their broadest part. The *head* is large, the eyes not very small as seen from above, the ocular lobes broad. There is a pair of horns between the eyes in both sexes. The *pronotum* is finely and rather sparsely punctured dorsally, and very strongly, and more or less confluently; at the sides. The front margin is smooth and slopes abruptly,

its upper edge forming a sharp carina, slightly prominent in the middle. The front angles are blunt, the lateral margins gently rounded in front and sinuate behind, and the base broadly rounded. The *elytra* are deeply striate, the striæ rather finely punctured, the 7th stria almost parallel with the 6th. The *pygidium* is very smooth and shining, with very minute and scanty punctures. The metasternal shield is quite smooth in the middle and bears a few fine scattered punctures at the sides, and the sides of the *metasternum* are finely but more closely punctured.

♂. The clypeus is very smooth and shining, with the sides straight and convergent, and the front margin strongly reflexed and feebly excised. The clypeus is separated by a curved carina from the forehead, which is very sparsely and minutely punctured, and the vertex is armed with a pair of short but slender horns, nearly straight, parallel, and inclined obliquely backwards. The pronotum is vertical, smooth, and almost unpunctured in front, and the upper edge of the declivity forms a sharp carina obtusely angulate in the middle.

♀. The clypeus is short and transversely rugose, with the margin rounded, but nearly straight in the middle, and separated by a strong rounded carina from the finely punctured forehead. The vertex bears a pair of short conical processes. The anterior carina of the pronotum is bluntly prominent in the middle.

Length, 9–14 mm. ; breadth, 5–8 mm.

S. India : Bangalore (*E. T. Atkinson*) ; Nilgiri Hills (*G. F. Hampson, H. L. Andrewes*). C. Prov. : Balaghat, Raigarh R. (*C. F. C. Beeson*, July).

Type in the British Museum.

Key to Group 10 (sternalis *group*).

1 (6)	Clypeus not rounded in front. ..	
2 (5)	Clypeus bilobed.	
3 (4)	Clypeus feebly bilobed	*sternalis*, sp. n., p. 222.
4 (3)	Clypeus strongly bilobed (♂ unknown)	*chebaicus* Bouc., p. 223.
5 (2)	Clypeus not bilobed	*diversiformis* Bouc., [p. 224.
6 (1)	Clypeus rounded in front.	
7 (10)	Pronotum metallic, grooved behind.	
8 (9)	Elytra opaque	*exquisitus*, sp. n., p. 225.
9 (8)	Elytra shining	*arboreus*, sp. n., p. 225.
10 (7)	Entirely black ; pronotum not grooved	*germanus* Gill., p. 226.

172. **Onthophagus sternalis**, sp. n.

Black, smooth and shining, with the antennæ and mouth-parts reddish yellow.

Oval, deeply waisted, and highly convex. The *head* is short, but minutely bilobed at the front margin, the eyes not very small above, the sides of the head bluntly angular in front

of the eyes, the *clypeus* separated from the forehead by a rather strong, nearly straight carina, and the posterior margin elevated into a similar carina. The *pronotum* is highly convex, finely and evenly punctured, more coarsely and rather rugosely near the front angles, and with an oblique depression on each side near the hind angles, containing moderately large granules. There is a well-marked median longitudinal groove upon the posterior half of the pronotum. The front angles are blunt, the sides almost straight in front, sinuate behind, and the base very obtusely angular in the middle. The *elytra* are finely striate, the intervals flat, and minutely, numerously punctured. The *pygidium* is fairly strongly and closely punctured. The *metasternum* is vertical in front and strongly compressed laterally, forming a blunt process. It is finely and not closely punctured in the middle, and more strongly and closely at the sides. The front tibiæ are short and stout.

♂. The clypeus is strongly and closely punctured.

♀. The clypeus is transversely rugulose.

Length, 7–10 mm. ; breadth, 4·5–6 mm.

BENGAL : Berhampore (*E. T. Atkinson*) ; Murshidabad (*E. T. Atkinson*). BIHAR : Pusa (*G. Bainbrigge Fletcher*, July) ; Chapra (*Mackenzie*). U. PROV. : Fyzabad (*R. W. G. Hingston*) ; Dehra Dun (*G. D. Pant*, Oct.). BOMBAY : Surat (*H. Maxwell Lefroy*, July).

This resembles, and is related to, *O. quæstus* Shp., but it is larger, and easily distinguished by the bilobed clypeal process and the granular patch on each side of the base of the pronotum.

173. **Onthophagus chebaicus.**

Onthophagus chebaicus, Bouc.,* Ann. Soc. Ent. France, lxxxviii, 1919 (1920), p. 314.

Onthophagus diversiformis, ♀, Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 214.

Shining black or deep pitchy-red, with the head and pronotum black, the antennæ and mouth-organs yellow, and the pygidium and lower surface thinly clothed with fine yellow setæ.

Oval, deeply waisted, and very convex, with the legs very short and stout. The *head* is broad, strongly dilated before the eyes but not distinctly angulate. It is rather finely rugose, densely in front and very lightly behind. The *clypeus* is short, divided by a very slight conical elevation from the forehead, and bearing two strong, sharp, upwardly curved teeth, slightly separated, at its front margin. The vertex is produced backward as a broad lamina, curving upward, with the outer angles sharp. The *pronotum* is densely granular, with a shining, finely and not very closely punctured area at the base on each side. There is a longitudinal median groove, rather deep at the

base, but fading anteriorly, and ending in a conical tubercle placed a little behind the front margin. The front angles are bluntly rectangular, the lateral margins nearly straight in front, strongly sinuate behind, and the base is strongly rounded and obtusely angular in the middle. The *elytra* are strongly striate, the intervals slightly convex and finely irregularly punctured. The *pygidium* is strongly and slightly rugosely punctured. The *metasternum* is finely and sparsely punctured in the middle, vertical in front, where it is narrowed to a point, and closely punctured at the sides.

The male is unknown.

Length, 10–12 mm. ; breadth, 6–7 mm.

BURMA : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.).

Type in the Genoa Museum.

This is a curious form, the unknown male of which will probably prove to differ considerably from the female here described. The latter was originally supposed by M. Boucomont to be the female of *Onthophagus diversiformis*.

174. Onthophagus diversiformis.

Onthophagus diversiformis Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 213 ; Ann. Soc. Ent. France, lxxxviii, 1919 (1920), p. 314.

Black and shining, with the antennæ and mouth-organs yellow.

Oval, deeply waisted, very convex, with short legs, entirely devoid of hair above and very smooth beneath. The *head* is angulate at the sides, produced into a rounded and recurved lobe in front and into a broad recurved plate behind. The *pronotum* is densely granular in front and rather finely and not closely punctured behind, with a well-marked median groove, the front angles blunt, the lateral margins gently rounded in front and sinuate behind, and the base strongly rounded and bluntly angular in the middle. The *elytra* are deeply striate, the striæ feebly punctured, and the intervals distinctly and irregularly punctured. The *pygidium* is very strongly and closely punctured. The *metasternum* is vertical in front and rather compressed and pointed, hairy in the front angles, and very smooth and lightly punctured upon the shield, the sides clothed with close, erect, reddish hair.

♂. The head is rather finely punctured, more finely and closely upon the clypeus, which is produced into a rounded and recurved lobe. There is a slight transverse carina before the eyes, and the hind margin of the head is produced into a broad plate, with the outer angles produced into short, recurved, parallel horns. The pronotum has a rather triangular excavation in the middle of its anterior part, and this and all

the anterior part are closely covered with fairly large granules, which change by degrees into fine and not close punctures upon the posterior part. The teeth of the front tibia are short, stout, and close together.

♀. The clypeus is closely transversely rugose, only slightly produced in front, the vertex is slightly or not at all produced behind, and the pronotum is not distinctly excavated.

Length, 9–15 mm. ; breadth, 5–8 mm.

BURMA : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.).

Type in the Genoa Museum ; co-type in M. Boucomont's collection.

The four posterior legs, and especially the tarsi, of this species are very short.

175. **Onthophagus exquisitus**, sp. n.

Black, opaque above, with the head and pronotum fiery coppery-red, sometimes with golden or greenish reflections, and the antennæ and mouth-organs bright yellow.

Elongate-oval, rather deeply waisted, extremely convex. The *head* is short and broad, rather flat, but a little hollowed between the eyes, with the posterior margin a little thickened, the sides bluntly angular, the *clypeus* broadly rounded. The surface is closely granular, becoming transversely rugulose upon the clypeus. The *pronotum* has a well-marked posterior median groove, and is finely, evenly, and rather asperately punctured on each side of the middle and granular at the sides and in the middle behind. The granules are oval, rather large and close in the inner lateral part, finer and less close elsewhere. The front angles are blunt, the sides gently rounded in front and sinuate behind, and the base obtusely pointed in the middle. The *elytra* are finely striate, with the intervals flat and minutely granular. The *pygidium* is finely and closely punctured. The *metasternum* is pointed and vertical in front, the shield is evenly and not very finely punctured, and the sides are finely and closely punctured. I have not seen a female.

Length, 5–6 mm. ; breadth, 3 mm.

U. PROV. : Dehra Dun (*S. N. Chatterjee*, July). BENGAL : Singla, 1500 ft., Darjeeling Dist. (June).

Type in the British Museum.

This species closely resembles the Malayan *O. denticollis* Lansb., but in that the pronotum is punctured except at the sides.

176. **Onthophagus arboreus**, sp. n.

Deep metallic green or coppery, with the elytra black, the tibiæ and tarsi dark red, and the antennæ bright orange.

The upper surface bears only very minute, scanty and inconspicuous pale setæ.

Elongate-oval, deeply waisted, and highly convex. The *head* is short and broad and very flat, the sides bluntly angulate before the eyes, the *clypeus* transversely rugose, with its front margin uniformly rounded and the forehead punctured and a little hollowed. The *pronotum* has a rather strong longitudinal median impression on its posterior half and is finely but sparingly punctured in the middle, but the punctures become indistinct, and are replaced by granules of varying shape and size at the sides. The front angles are very blunt, the sides are feebly rounded in front, slightly sinuate behind, and the base is very bluntly angulate in the middle. The *elytra* are finely striate, with the intervals slightly convex, not very shining, and finely and sparingly asperate-punctate. The *pygidium* is shining and rather evenly, not closely nor very finely, punctured. The *metasternum* is produced into a blunt process anteriorly, and is finely and very sparsely punctured in the middle and coarsely and shallowly at the sides.

Tho two sexes are almost alike.

Length, 4·5 mm. ; breadth, 3 mm.

U. PROV. : New Forest, Dehra Dun (*J. C. M. Gardner*, Feb.). BIHAR : Pusa (July, Aug., Sept.). MYSORE : Sagar (Sept.).

Type in the British Museum.

Found in the hollow of a tree at Pusa.

177. **Onthophagus germanus.**

Onthophagus germanus Gill.,* Bull. Soc. Ent. Belg. 1927, p. 254.

Black, with the lower surface and the dorsal part of the pronotum shining, the antennæ yellow, and the mouth-organs and legs deep red. The lower surface is clothed with reddish hair and the upper surface naked.

Oval, deeply waisted, and highly convex. The *head* is flat, broad, and densely rugose, with the sides angulate, and the clypeal margin rounded, with a scarcely perceptible angulation in the middle. The *pronotum* is very minutely and fairly sparsely punctured upon the dorsal part, more closely and less finely in front and at the sides, and the punctures are replaced at the sides by closely packed and not very fine roundish granules. The front angles are broadly rounded, the lateral margins feebly rounded in front and sinuate behind, and the base obtusely but distinctly angulate in the middle. The *elytra* are finely striate, with distant and very inconspicuous punctures in the striæ, the intervals flat and extremely minutely and scantily punctured. The *pygidium* is finely and rugosely punctured. The *metasternum* forms a sharply

compressed and pointed vertical process in front, and its surface is finely and fairly closely punctured in the middle, very closely and rather rugosely at the sides.

The two sexes are alike externally.

Length, 6–7 mm.; breadth, 4 mm.

BENGAL: Kurseong (*Verschraeghen*). U. PROV.: Naini Tal, 7000–8600 ft. (*H. G. Champion*, July).

Type in Dr. Gillet's collection.

Mr. Champion found several specimens in a fungus.

In the type specimen, kindly lent to me by Dr. Gillet, rather more than a quarter of the width of the pronotum on each side is closely granular. In those from Naini Tal the granular area occupies less than a quarter of the surface, and is separated from the shining median area by a fairly closely and strongly punctured band.

Key to Group 11 (rugulosus *group*).

Elytra asperately punctured	*rugulosus* Har., p. 227.
Elytra granular	*productus* Arrow, p. 228.

178. **Onthophagus rugulosus.**

Onthophagus rugulosus Har.,* Deutsche Ent. Zeits. xxx, 1886, p. 289.

Onthophagus expansicollis Fairm., C. R. Soc. Ent. Belg. xxxv, 1891, p. 193.

Black, opaque above and shining beneath, with the antennæ and mouth-organs red, and clothed with reddish hair beneath, with very minute pale setæ above.

Oval and not very convex. The *head* is not very large nor very broad, the ocular lobes are strongly but not angularly rounded externally, the *clypeus* is transversely rugose, with its margin rounded, and separated by a feebly curved carina from the closely punctured forehead. The *pronotum* is closely punctured upon its posterior half, the punctures becoming confused and rugose anteriorly. The lateral margins are strongly sinuate behind, the hind angles are strongly marked, the base is obtusely angulate in the middle, and there is a slight posterior median groove, which is strongly impressed behind. The *elytra* are rather deeply striate, the intervals feebly convex and fairly strongly and closely asperately punctured. The *pygidium* is strongly and closely punctured. The metasternal shield is sloping, punctured, and hairy on each side, with a smooth middle line, and the sides of the *metasternum* are also punctured and hairy.

♂. The head is rather circular in outline, the clypeus longer than in the female, the carina shorter and feebler, and the vertex produced backward as a pair of outwardly curved horns united by a semicircular carina. The prothorax is narrowed

and produced in front, elevated in the middle, and strongly sloped on each side, with the front angles sharp, hollowed, smooth, and shining, the sides strongly dilated in the middle, and the basal part abruptly perpendicular, except in the middle. The front legs are elongate, the front tibiæ very long, with short external teeth.

♀. The clypeal carina is strongly elevated, and there is a posterior carina between the eyes, with a slight tubercle in the middle. The prosternum is abruptly vertical in front, the upper edge of the declivity forming a strong carina. The front angles are slightly produced but blunt, and the basal part of the pronotum is strongly rounded on each side.

Length, 10–14 mm.; breadth, 6–8 mm.

ASSAM: Tura, Garo Hills, 3500–3900 ft. (*S. Kemp*, July, Aug.). S.W. CHINA: Yunnan.

Type in the German Entomological Institute, Berlin.

179. **Onthophagus productus.** (Plate XII, figs. 9, 10.)

Onthophagus productus Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 423.

Black, with the lower surface, and the basal and lateral parts of the pronotum of the male, shining, the mouth-organs orange, the tarsi and a thin hairy clothing upon the lower surface dark reddish. The elytra and parts of the pronotum of the female bear inconspicuous minute dark setæ.

Oval and very convex, with the prothorax of the male much narrowed in front. The *head* is small and very little dilated laterally, with the *clypeus* a little produced but slightly truncate in front and transversely rugose, the posterior part of the head rather closely punctured. The lateral margins of the *pronotum* are strongly angulate in the middle, nearly straight before the angulation, and gently sinuate behind it, the front angles are produced but blunt, the hind angles well marked, and the base strongly rounded. The surface is rugosely punctured in front, separately punctured behind, with a basal groove, and falls steeply and abruptly to the hind angles. The *elytra* are finely striate, the 7th stria is strongly curved, the dorsal intervals are flat and rather strongly punctured, and the lateral intervals rugosely punctured and rather convex. The *pygidium* is strongly punctured, the metasternal shield is rather closely punctured in front, more sparingly behind, with a smooth median line, and the sides of the *metasternum* are rather closely and asperately punctured.

♂. The head is lightly sculptured and bears a pair of horns arising behind the eyes, sloping backward, strongly curved, united at the base by a curved carina, and together enclosing

part of a circle. The prothorax is strongly narrowed and produced in front, hollowed, smooth and shining on each side, with the front angles deeply excavated. The basal part also is shining, the puncturation fine and not close, and the lateral declivity very strong and abrupt. The front tibia is elongate.

♀. The clypeus is strongly rugulose and separated by a straight carina from the forehead, and there is a slightly trisinuate carina between the eyes. The pronotum is strongly and closely punctured everywhere, the puncturation becoming rugose upon the anterior half. There is a straight transverse carina, a little interrupted in the middle, just behind the front margin.

Length, 9·5–11 mm. ; breadth, 5·5–6·5 mm.

U. PROV. : Mussoorie, 6500–7000 ft. (*Col. Harcourt*, June ; *S. N. Chatterjee*, July) ; C. Almora, Kumaon (*H. G. Champion*) ; Ranikhet (*H. G. Champion*). BENGAL : Soom, Darjeeling Dist., 4000–5000 ft. (*Lord Carmichael's collector*, July).

Type in the British Museum.

Key to Group 12 (catta *group*).

1	(30)	Upper surface smooth or with very fine hairy clothing.	
2	(21)	Pronotum not shining.	
3	(12)	Upper surface not uniformly dark.	
4	(9)	Elytra pale.	
5	(8)	Pronotum dark green or coppery.	
6	(7)	Front angles of pronotum not very sharp	*catta* F., p. 230.
7	(6)	Front angles of pronotum very sharp.	*bonasus* F., p. 231.
8	(5)	Pronotum light brown, with the punctures black	*rectecornutus*, Lansb., [p. 233.
9	(4)	Elytra dark, with red or yellow spots.	
10	(11)	Pronotum well punctured	*senex*, Bouc., p. 234.
11	(10)	Pronotum sparsely punctured	*seniculus* F., p. 235
12	(3)	Upper surface uniformly dark.	
13	(16)	Not metallic.	
14	(15)	Front angles of pronotum not very acute	*ramosus* Wied., p. 236.
15	(14)	Front angles of pronotum very acute.	*acuticollis*, sp. n., p. 237.
16	(13)	Slightly metallic.	
17	(18)	Pronotum granular, with very few punctures	*amplexus* Sharp, p. 238.
18	(17)	Pronotum bearing numerous punctures.	
19	(20)	Punctures of pronotum not dense nor asperate	*abrcui*, sp. n., p. 239.
20	(19)	Punctures of pronotum dense and asperate	*laborans*, sp. n., p. 240.
21	(2)	Pronotum shining.	
22	(23)	Small ; pronotum closely rugose	*negligens* Walk., p. 241.
23	(22)	Large ; pronotum not closely rugose.	
24	(25)	Elytra unpunctured	*nilgirensis* Gill., p. 242.
25	(24)	Elytra punctured.	

26 (29) Pronotum not metallic. [p. 242.
27 (28) Pronotum black .... *manipurensis* Arrow,
28 (27) Pronotum red..................... *rubricollis* Hope, p. 244.
29 (26) Pronotum metallic .... *vividus* Arrow, p. 245.
30 (1) Upper surface clothed with long erect hairs .... *martialis* Bouc., p. 246.

180. **Onthophagus catta.**

Scarabæus catta F., Mant. Ins. i. 1787, p. 12.
Scarabæus gazella F.,* op. cit. ii, 1787, App. p. 377.
Copris metallicus F., Ent. Syst., Suppl. 1798, p. 28.
Copris antilope F., op. cit. p. 32.

Testaceous yellow, with the head, pronotum (except a narrow pale margin at the sides and base), the median part of the metasternum, the front tibiæ, the greater part of the middle

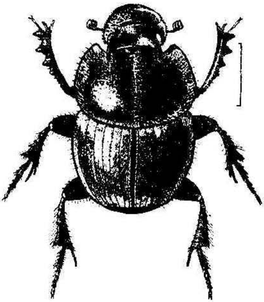

Fig. 23.—*Onthophagus catta*, ♂.

and hind tibiæ, and a large oval spot upon the lower surface of the four posterior femora, greenish- or coppery-black. The extreme edges of the prothorax, elytra, and all the segments of the body and legs are also dark.

Broadly oval and convex, smooth and moderately shining, with a thin clothing of yellow setæ upon the legs and lower surface. The *head* is semicircular, with the front margin strongly reflexed and very feebly sinuate in the middle. The forehead is finely and closely punctured, and divided from the clypeus by a strong, feebly curved carina. The *pronotum* bears rather sparse granules in its median part, replaced behind by fine scattered punctures, and is smooth and unpunctured round the circumference. There is an entire raised margin, the sides are nearly straight in front, feebly sinuate behind, the front angles sharply produced, the hind

angles obsolete, and the base feebly angulate in the middle. The *elytra* are finely striate, with the intervals flat and unpunctured. The *pygidium* bears an angulate basal carina and a few scattered punctures. The *metasternum* bears only a few setigerous punctures.

♂. The clypeus is rather feebly rugulose and shining. The vertex bears a pair of slender horns, curving outward and inclined a little backward, a little flattened at the base and not united. The front of the pronotum is very smooth and shining and almost vertical in the middle, the declivity surmounted by two minute prominences separated by a slight groove. The front tibia is elongate, slender and curved, its inner extremity produced into a long spur and its external teeth rather widely separated.

♀. The clypeus is rather closely rugulose and opaque, and the vertex bears a strongly elevated straight carina. The front of the pronotum is vertical in the middle and produced on each side, forming a pair of strong, slightly divergent, blunt processes.

Length, 8–13 mm. ; breadth, 5–8 mm.

SIND : Karachi (*T. R. D. Bell*, *M. Maindron*, Aug., Sept.). N.W. FRONTIER PROV. : Bannu (*Dr. Pennell*). PUNJAB : Chichawatin, Montgomery Dist. (*S. Bahadur*, June) ; Lyallpur (June, July, Aug.). BOMBAY : Baroda (*Vinciguerra*, Nov.) ; Khandesh (*T. R. D. Bell*) ; Belgaum (*H. E. Andrewes*). C. PROV. : Ambagheri, Nagpur, 1000 ft. (*E. A. D'Abreu*, May, June) ; Dharakoh, Betul Dist., 2600 ft. (*E. A. D'Abreu*, April) ; Baihar, Balaghat Dist. (June). C. INDIA : Mhow (*E. Selous*). S. INDIA : Trichinopoly (*R. O. Jermyn*, Nov.) ; Cocanada (*E. A. Glennie*, Jan.) ; Madura ; C. Comorin (*J. Castets*). CEYLON : Colombo (*G. M. Henry*, Jan., Mar.) ; Murunkan, N. Prov. (*G. M. Henry*, July) ; Welikade (*G. M. Henry*, Aug.). ARABIA. E., S., and W. AFRICA. MADAGASCAR.

Type of *catta* unknown ; those of *gazella*, *metallicus*, and *antilope* in the Copenhagen Museum.

This is one of the most abundant and widely distributed species of the genus. Males were named by Fabricius *gazella* and *antilope* and females *catta* and *metallicus*.

181. **Onthophagus bonasus.** (Plate XIII, figs. 5, 6.)

Scarabæus bonasus F., Syst. Ent. 1775, p. 23 ; d'Orb., L'Abeille, xxix, 1898, p. 218.

Testaceous yellow, with the head, pronotum (except a narrow pale margin at the sides and base), the elytral suture, the median part of the metasternum, the upper surface of the femora and tibiæ, and a large patch on the lower side of each femur, greenish-black, the whole surface suffused with a slight metallic lustre.

Very broadly oval and convex, smooth and shining, with the legs and sides of the body beneath clothed with yellowish hair. The *head* is semicircular in shape, with the front margin very strongly reflexed and extremely feebly sinuate in the middle. The *clypeus* is finely and closely granulate, and is separated from the forehead, which is more sparsely granulate, by a strong curved carina. There is a short, acute, erect horn in the middle of the forehead, and the vertex bears a pair of horns, forming a backwardly directed crescent, the base a little flattened and granulate, and each with a slight basal tooth at the inner edge. The *pronotum* is very smooth in front and behind, with a few scattered granules in its middle part. There is a slight median groove, on each side of which, a little before the middle, there is a slight tubercle. There is a complete raised margin, the front angles are acutely produced, the sides feebly sinuate near the hind angles, and the base very feebly angulate in the middle. The *elytra* are finely striate, with extremely few and minute setigerous punctures upon the intervals. The *pygidium* bears an angulate basal carina and similarly sparse and minute setigerous punctures. The lower surface is very sparingly pilose. The middle and hind femora are short and broad, the tibiæ very strongly toothed externally.

♂. The front tibia is elongate, slender, and curved, with rather feeble external teeth, its inner extremity produced as a long slender tooth.

Length, 12–17 mm. ; breadth, 7·5–9·5 mm.

SIND : Karachi (*M. Maindron*, Aug., Sept.). PUNJAB : Murree, 5500 ft. (*B. M. Bhatia*, June) ; Lyallpur (*June*). N.W. FRONTIER PROV. : Bannu (*Dr. Pennell*). BOMBAY : Belgaum (*H. E. Andrewes*). U. PROV. : Haldwani, Kumaon Div. (*H. G. Champion*) ; Kheri Forest (*H. G. Champion*, Feb.). BENGAL : Sarda (*F. W. Champion*) ; Calcutta (*D. Ribbe*). C. PROV. : Dharakoh, Betul Dist., 2600 ft. (*E. A. D'Abreu*, April) ; Baihar, Balaghat Dist. (June) ; Nagpur, 1000 ft. (*E. A. D'Abreu*, May). S. INDIA : Trichinopoly (*C. Leigh*, Oct.). MYSORE : Bhadravati, Shimoga (*H. S. Rao*, Dec.). CEYLON : Murunkan, N. Prov. (*G. M. Henry*, July). BURMA : Rangoon (*L. Fea*, May) ; Toungoo (*L. Fea*, Oct.) ; Bhamo (*L. Fea*, April). SIAM. TONKIN. CAMBODIA.

Type ♀ in the Copenhagen Museum.

This species closely resembles the yet commoner and more widely distributed *O. catta*, but differs in the important fact that the armature is identical in male and female. The horns diverge more than in the male of *O. catta*, and the sharp median process, as well as the thoracic groove, are distinctive of *O. bonasus*.

182. Onthophagus rectecornutus.

Onthophagus rectecornutus Lansb., Notes Leyd. Mus. v, 1883, p. 49; Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 421.

Testaceous yellow, with a faint metallic greenish lustre and closely mottled with black, except upon the pygidium, the punctures, margins, and sutures being black.

Oval, very convex, feebly shining, the upper surface bearing very minute and inconspicuous greyish setæ. The *clypeus* is shortly semicircular in shape, with the margin entire and strongly reflexed, the forehead very feebly punctured, smooth and shining, and the vertex bears a pair of unconnected horns, sloping backwards, rather broad at the base, and tapering

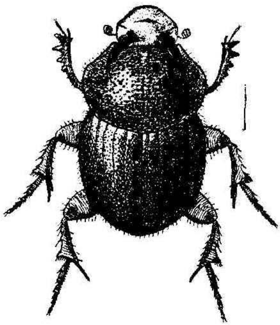

Fig. 24.—*Onthophagus rectecornutus*, ♂.

to a point at the tip. The *pronotum* is strongly and rather irregularly punctured, except at the anterior border, which is sloping and rather smooth and shining, with only a very few minute punctures. It is completely margined, the front angles are rather sharp, the sides gently rounded in front, the base strongly rounded and not distinctly angulate. The *elytra* are rather deeply striate and the intervals fairly strongly and closely punctured. The *pygidium* is strongly, not closely, punctured, the *metasternum* is finely and rather sparsely punctured, and the four posterior femora are strongly punctured on their lower face.

♂. The clypeus is moderately closely punctured, the anterior carina is short and acuminate, and the horns are divergent, nearly straight, a little curved inward at the tip. The front tibia is rather elongate and narrowed, with the teeth separated.

♀. The clypeus is closely transversely rugose, the anterior carina is long, straight, and angulate in the middle, and the horns are nearly parallel. The front tibia is broad, and the teeth are stout and close together.

Length, 7–10 mm.; breadth, 5–6 mm.

ASSAM: Naga Hills, 3000 ft. (*S. N. Chatterjee*, March). BHUTAN: Maria Basti (*L. Durel*). BENGAL: Chittagong Hill Tracts, Sitapahar R. (*C. F. C. Beeson*, May). BURMA; Bhamo (*L. Fea*, Oct.); Toungoo (*L. Fea*, Oct.); Shwegu-Myo (*L. Fea*, Oct.); Palon, Pegu Div. (*L. Fea*, Sept.); Karen Hills, Cheba, 2700–3300 ft., Asciuii Ghecu, 4200–4500 ft. (*L. Fea*, April). TENASSERIM: Meetan (*L. Fea*, April). BIHAR: Pusa (*A. Murtaza*, Feb., April, May, June, July). S. INDIA: Nilgiri Hills (*H. L. Andrewes*): Malabar; Chikkangalur, Bangalore (*Tabourel*). CEYLON: Kandapola (*G. M. Henry*, Sept.); Horton Plains, 7000 ft. (*G. M. Henry*, April); Homagama, W. Prov. (*G. M. Henry*, Mar.); Madugoda (*G. M. Henry*, April); Hakgala (*G. M. Henry*, Aug.); Kandy (*G. E. Bryant*, June). TONKIN.

Type in M. René Oberthür's collection.

183. **Onthophagus senex.**

Onthophagus senex Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 212.

Dark chocolate-brown, with the head and pronotum coppery and the antennæ, femora, pygidium, parts of the lower surface, a broad anterior lateral patch at the margin of the prothorax, and two transverse ranges of spots on the elytra, orange, these usually consisting of three spots at the basal margin (upon the 2nd, 4th, and 6th intervals) and three before the middle (upon the 2nd, 3rd, and 4th intervals). The pygidium, femora, and parts of the lower surface are also orange.

Broadly oval, compact and convex, not very shining above. The *head* bears two straight, parallel carinæ, the *clypeus* is transversely rugose, and the head between the carinæ is rugosely punctured or granular. The *pronotum* is granular in front and fairly closely punctured behind, the punctures fine upon the dorsal part and larger and less numerous at the sides. There is a well-marked longitudinal median furrow upon the posterior half. The lateral margins are gently rounded in front, with produced, but not very sharp, anterior angles, and broadly sinuate behind, and the base is completely margined and very obtusely angular in the middle. The *elytra* are distinctly striate, with the striæ minutely and the intervals irregularly punctured, the dorsal intervals flat and finely punctured and the lateral ones a little convex and strongly punctured. The *pygidium* is very strongly but sparsely punctured and thinly hairy. The metasternal

shield is punctured and hairy in front and behind, smooth in the middle, and the sides of the *metasternum* are sparingly punctured and clothed with erect hairs.

♂. The lateral margins of the clypeus are straight and meet in a slightly obtuse angle, which is strongly reflexed. The two carinæ are only feebly elevated, the anterior one short and straight, the posterior curved and extending from eye to eye. The sides of the head are nearly parallel behind. The pronotum is strongly elevated in the middle and abruptly vertical in front, and the margin of the declivity forms a straight, sharp carina interrupted in the middle and ending abruptly on each side.

♀. The clypeus is semicircular, with a strongly reflexed margin. The two carinæ are short, straight, and strongly elevated. The pronotum has a slight anterior declivity in the middle, its upper edge forming two curved and not very sharply defined ridges separated by a slight furrow.

Length, 13–16 mm. ; breadth, 7–9 mm.

BURMA : Palon, Pegu Div. (*L. Fea*, Sept.) ; Toungoo (*G. Q. Corbett*). TENASSERIM : Meetan (*L. Fea*, April). INDO-CHINA.

Type in the Genoa Museum.

184. **Onthophagus seniculus.** (Plate XIII, figs. 3, 4.)

Scarabæus seniculus F., Spec. Ins. i, 1781, p. 23.

Dark chocolate-brown, with the head and pronotum coppery and the antennæ, femora, pygidium, parts of the lower surface, the anterior part of the lateral margin of the pronotum, and three transverse ranges of spots upon the elytra, orange-red. The elytral spots consist usually of four at the basal margin (upon the 2nd, 3rd, 4th, and 6th intervals), two before the middle (upon the 2nd and 4th intervals), and three just before the apical margin (upon the 2nd, 4th, and 6th intervals).

Broadly oval, moderately compact, smooth and not very shining above. The *head* bears two nearly straight, parallel carinæ, and the clypeus is closely transversely rugose. The dorsal part of the *pronotum* is sparingly and extremely finely punctured, the punctures becoming stronger and ultimately rugose anteriorly. There is a smooth, shining excavation just behind the front margin on each side and a horizontal prominence behind each excavation. The base is finely margined, and forms a blunt angle in the middle. The *elytra* are opaque, finely striate, with the intervals flat and minutely and sparingly punctured. The *pygidium* bears rather larger setigerous punctures. The sides of the thorax and abdomen beneath are rather strongly punctured and clothed with yellow setæ. The basal joint of the antenna has a finely serrate anterior edge.

♂. The *clypeus* curves upward a little in front, the sides are nearly straight, and meet in a slightly obtuse angle. The anterior cephalic carina is rather feeble, the posterior one is produced to a point at each end, and the space between the carinæ is smooth and shining. The pronotum bears two moderately long, diverging, horizontal processes, and the whole front margin is smooth and shining. The front tibia is a little elongate, with the teeth rather small.

♀. The head is almost semicircular in outline, with the clypeus a little produced in the middle, its front margin strongly reflexed, the two carinæ sharply elevated, and the space between them rugose. The sides of the pronotum are rather strongly punctured, and the dorsal prominences are slight and rounded.

Length, 10·5–15 mm. ; breadth, 6–8 mm.

BURMA : Thincan (*L. Fea*, June) ; Schwegu-Myo (*L. Fea*, Oct.) ; Bhamo (*L. Fea*, June) ; Mergui Dist. (*C. R. Robbins*, Nov., Dec.) MALAY PENINSULA. INDO-CHINA. S. CHINA.

Type unknown.

185. **Onthophagus ramosus.** (Plate XII, figs. 6, 7.)

Copris ramosa Wied.,* Zool. Mag. ii, 1, 1823, p. 13.

Opaque, black or very dark blue-black or indigo-black above, with the lower surface shining black.

Broadly oval, compact, moderately convex, almost without hair or setæ above or beneath. The *head* is almost semicircular in outline, with the entire surface transversely rugose, the front margin reflexed, the clypeus separated from the forehead by a slight rounded carina, and the vertex bearing a pair of backwardly inclined horns united by a straight carina between the eyes, which has a slight sharp point in the middle . The *pronotum* is moderately closely punctured, the punctures rather coarse and confluent at the sides and finest and least close near the middle of the base. There is a slight flattening or feeble depression at the middle of the anterior part. The front angles are bluntly produced, the sides nearly straight, the margin distinct all round, and the base gently rounded and not angulate in the middle. The *elytra* are finely striate, the striæ finely punctured, the intervals flat and extremely finely and sparsely punctured except at the sides, where the punctures are larger and more numerous. The *pygidium* is opaque and rather finely punctured. The lower surface is very smooth and shining, with the *metasternum* closely punctured in front, the meso-metasternal suture straight, the middle and hind femora with a few setigerous punctures near the end.

♂. In well-developed specimens the horns are long and compressed laterally, diverge strongly at the base, curve outward, and again approach one another at the tips, and each bears a strong tooth near the middle of the anterior edge. In small specimens only a stout pointed stump is found on each side.

♀. The female resembles in all respects the males of low development except in the unemarginate last ventral sternite.

Length, 8–11·5 mm. ; breadth, 5·5–6·5 mm.

KASHMIR : Saidabad (*D. Ribbe*). PUNJAB : Kangra Valley, 4500 ft. (*G. C. Dudgeon*). U. PROV : W. Almora (*H. G. Champion*) ; Dehra Dun (*C. F. C. Beeson*, July, Aug.) ; Chakata Range, Haldwani (*S. N. Chatterjee*, June). C. PROV. : Motinala R., S. Mandla (*N. C. Chatterjee*, June) : Nagpur, 1000 ft. (*E. A. D'Abreu*, June, July). BIHAR : Pusa (*G. D. Austin*, Oct.). C. INDIA : Mhow (*E. Selous*). BOMBAY : Belgaum (*H. E. Andrewes*). S. INDIA : Mysore (*T. V. Campbell*) ; Kanara (*T. R. D. Bell*) ; Bangalore : Pondicherry. SIAM.

Type in the Copenhagen Museum.

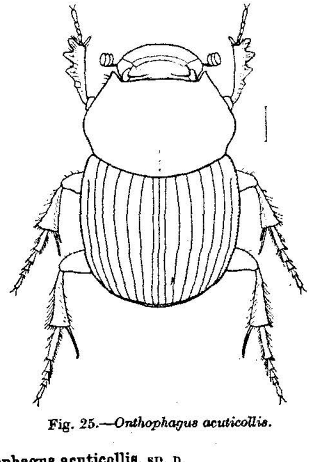

Fig. 25.—*Onthophagus acuticollis.*

186. Onthophagus acuticollis, sp. n.

Entirely black, rather opaque above, and without hairs or setæ, except a scanty clothing upon the legs and lower surface.

Broadly oval, compact, and not very convex. The *head* is broad, flat, and rugose, with the sides strongly rounded. The *pronotum* is unevenly and unequally punctured, the punctures coarse and partly confluent at the sides. The front angles are very acutely produced, the sides a little sinuate in front and behind, the hind angles obsolete, and the base gently rounded. The *elytra* are finely striate, the intervals flat and irregularly granular. The *pygidium* is opaque, feebly and sparsely punctured. The prothorax has a very sharp ridge beneath, extending from the front angle to the coxal cavity on each side. The metasternal shield is punctured in front and almost smooth behind, and the sides of the *metasternum* are very shallowly pitted.

♂. The clypeus is lightly excised in the middle and separated by a curved carina from the forehead, which has a very slight tubercle in the middle.

♀. The clypeal margin is evenly rounded and the forehead bears a carina parallel to the clypeal carina.

Length, 7–8 mm.; breadth, 4·5–5 mm.

S. INDIA: Chikkaballapura, Madura (*T. V. Campbell*); Cape Comorin (*Castets*).

Type in the British Museum.

187. **Onthophagus amplexus.** (Plate XIII, figs. 14, 15, 16.)

Onthophagus amplexus Sharp, Col. Hefte, xiv, 1875, p. 53; Lansb., Notes Leyd. Mus. v, 1883, p. 41.
Onthophagus smeei Har., Col. Hefte, xiv, 1875, p. 137.
Proagoderus smeei Marcus, Arch. f. Nat. lxxxiii, A 10, 1917 (1919), p. 64.

Deep metallic green, dark blue or bluish-black, very smooth and shining beneath, closely sculptured and not very shining above, with scanty and inconspicuous greyish hairs at the sides.

Oval and compact in shape. The *head* is semicircular and entirely rugosely granular, with a clothing of short recumbent hairs, and bears a strong anterior carina and a pair of posterior horns, directed backward and united at the base. The *pronotum* is long, rugosely granular, completely margined, with the front angles bluntly produced and the base strongly rounded, obtusely angular in the middle, but not lobed. It is excavated in front and the dorsal part is produced forward. The *elytra* are rather indefinitely striate, with the intervals slightly convex and closely and deeply punctured. The *pygidium* is opaque and moderately punctured. The front angles of the prothorax are hairy beneath, the sides of the metasternal shield and those of the *metasternum* are strongly but scantily punctured, and there is a closely punctured patch in the middle of the hind margin. The middle and hind femora bear only scattered punctures.

♂. The clypeal carina is short, and the vertex bears a pair of long slender horns, strongly curved outward, united by a continuous carina and enclosing part of a circle. The connecting carina is sharply toothed in the middle. The anterior part of the pronotum is deeply hollowed and very smooth and shining in the cavity, and the posterior margin of the cavity is produced obliquely forward in the middle, forming a strongly compressed knife-like horn, with its tip rounded and, at the greatest development, a very little thickened.

♀. The clypeal carina is longer and more strongly elevated, and the posterior carina is produced straight backward at each end, forming a pair of rather short parallel horns. The anterior part of the pronotum is more narrowly and shallowly excavated, but fairly deeply on each side, and the posterior margin of the excavation is produced forward as a sharp-edged rounded lobe.

Length, 12–15 mm.; breadth, 8–9 mm.

PUNJAB. UNITED PROV.: Dehra Dun (*C. F. C. Beeson*, July).

Type in M René Oberthür's collection, and probably also that of *smeei* Har.

The species is said by Lansberge to occur also in Sumatra.

188. **Onthophagus abreui**, sp. n.

Very deep chocolate-brown, with a light coppery or greenish lustre above and beneath, the lower surface shining, the upper surface, except the head of the male, opaque. The antennæ and mouth-organs are yellow, and the surface is clothed with yellowish setæ, those upon the upper side minute but fairly close.

Rather narrowly oval, deeply waisted, moderately convex. The *head* is rather narrow, the sides gently rounded, the *clypeus* slightly produced, with the front margin entire, the hinder margin of the head giving rise to a short process in the middle. The *pronotum* is rather finely and closely punctured, the front angles and a small retuse area on each side, near the hind angles, bearing only a few minute punctures, and some of the punctures at the sides being more or less confluent and rugose. The front angles are rather sharp, the sides nearly straight in front and feebly sinuate behind, the base obtusely angulate in the middle. The elytra are finely striate, the intervals flat and bearing numerous minute irregular granules. The *pygidium* is fairly strongly but not closely punctured. The metasternal shield is smooth in the middle, and the sides and base, together with the sides of the *metasternum*, are rather closely punctured.

♂. The head is smooth and shining, with the sides and the anterior part of the clypeus finely punctured. A rather feeble

curved carina divides the clypeus from the forehead, and the posterior margin of the head is produced into a short backwardly directed horn. The pronotum has a slight transverse hollow in the middle of its front margin.

♀. The head is densely rugose and opaque, with a slight, but sharp, curved carina separating the clypeus and forehead, and the hinder margin of the head bears a conical tubercle in the middle.

Length, 10–12 mm.; breadth, 5·5–7 mm.

U. PROV.: Haldwani (*B. M. Bhatia*, May). C. PROV.: Dharakoh, Betul Dist., 2600 ft. (*E. A. D'Abreu*, April); Sylari, Pench Valley, 1900 ft. (*E. A. D'Abreu*, April). S. INDIA: Malabar.

Type in the British Museum.

This has a rather close resemblance to *O. griseosetosus* Arr., but is easily distinguished by the punctured, instead of granular, surface of the pronotum.

189. **Onthophagus laborans**, sp. n.

Dull black, with the head, the anterior margin of the pronotum, and the lower surface dark coppery and shining, and moderately closely clothed above with short, erect, grey setæ. The antennal club is black.

Oval, very compact and convex. The *head* is short and broad, with the ocular lobes strongly rounded and the clypeus strongly punctured, broadly rounded and very feebly excised in front and divided by a strong, curved carina from the forehead. The *pronotum* bears closely set horseshoe-shaped or imperfectly annular impressions upon its hinder part, these changing gradually to close, rounded granules in the anterior part. The front margin is vertical and smooth in the middle, and its upper edge bears four slight prominences, the two middle ones united in the female. The front angles are a little produced and moderately sharp, the lateral margins nearly straight in front and feebly sinuate behind, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and rather numerously granular. The *pygidium* is strongly and closely punctured. The metasternal shield is strongly but sparingly punctured, and the sides of the *metasternum* are fairly strongly and closely punctured.

♂. The vertex of the head bears a pair of short, straight, erect horns, united by a curved carina at the base. The upper edge of the vertical front margin of the pronotum bears four nearly equidistant tubercles.

♀. The clypeus is rather rugosely punctured, and the head bears a curved anterior and a straight posterior carina. The two middle processes of the prothoracic ridge are united.

Length, 5–6 mm.; breadth, 3–3·5 mm.

Bombay: Nasik (*N. B. Kinnear*, July); Dharwar (*H. Swale*, Oct.–Jan.). C. Prov.: Chikalda Berars, 3664 ft. (*N. B. Kinnear*, Dec.).

This has a very close resemblance to *O. circulifer* Arr., and a careful examination is necessary in order to distinguish the females. The pronotum of the latter bears simple annular punctures, whereas in *O. laborans* it is granular and without true punctures, the apparent punctures of the posterior part being incomplete behind. In the male the clypeus is shorter and the short tooth between the cephalic horns is absent.

190. **Onthophagus negligens.**

Onthophagus negligens Walk., Ann. Mag. Nat. Hist. (3) ii, 1858, p. 209.

Black or dark brown, not very shining, with the head and prothorax coppery and the 2nd, 4th, 6th, and 8th intervals of each elytron or the basal and apical portions of them, and sometimes the whole or the basal and apical parts of the intervening intervals, reddish-yellow. The antennæ and mouth-organs, the pygidium and sides of the abdomen also are yellowish, and the body is clothed above and beneath with pale setæ, which are minute upon the upper surface.

Oval and very convex. The *head* is fairly short and broad, the clypeal margin rounded, with a very feeble excision in the middle, and divided from the forehead by a strongly rounded carina. The *pronotum* is densely and rather finely and rugosely granular. The front angles are fairly sharply produced, the lateral margins nearly straight in front and sinuate behind, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and minutely and sparsely granular. The *pygidium* is rather finely and sparsely punctured. The metasternal shield and the sides of the *metasternum* are strongly but not very closely punctured.

♂. The clypeus is shining and bears only a few large punctures, and between the eyes rises a short rectangular lamina with its summit a little emarginate and the angles sometimes slightly divergent. The front margin of the pronotum is smooth and nearly vertical, and its upper edge bears four equidistant tubercles.

♀. The clypeus is rather coarsely rugose and there is a straight carina between the eyes. The pronotum bears a transverse carina just behind the front margin and a small tubercle in line with it on each side.

Length, 5–6 mm.; breadth, 3·5–4 mm.

S. India: Bangalore (*C. F. C. Beeson*, Aug.); Madura

(*T. R. D. Bell*); Calicut. CEYLON: Koggala (*E. E. Green*, Nov.); Kala Oya (*E. E. Green*, Dec.); Murunkan, N. Prov. (*G. M. Henry*, July); Wirawila, S. Prov. (*G. M. Henry*, July).

Type in the British Museum.

O. forcipatus Har. is not identical with this species, as stated in the Junk Catalogue.

191. **Onthophagus nilgirensis.**

Onthophagus nilgirensis Gillet,* Ann. Soc. Sci. Brux. li, 1922, p. 128.

Black, with the antennæ bright yellow and the sides of the body beneath clothed with rather thick reddish hair.

Broadly oval, moderately compact and convex, smooth and shining, with the elytra subopaque. The *clypeus* is produced and limited behind by a short straight carina. The *pronotum* is entirely smooth above, a little excavated in front, completely margined, with the front margin very broad in the middle, the front angles blunt, and the base obtusely angulate in the middle. The *elytra* are very finely and lightly striate except at the base and sides, with the intervals unpunctured and the dorsal ones subopaque. The *pygidium* is shining and finely punctured, and the *metasternum* is minutely punctured in the middle. The basal joint of the antenna has a finely serrate anterior edge, and the front tibia has four blunt teeth.

♂. The clypeus is smooth behind, produced to a point in front, and recurved; the forehead is smooth, and the vertex is produced backward as a smooth lamina, angulate on each side and terminating in a recurved finger-like process. The pronotum is very feebly punctured at the sides and has a smooth transverse hollowed space in front.

♀. The clypeus is slightly produced and closely transversely rugose, the forehead is lightly punctured, and the vertex bears a short erect laminar horn, truncate at the tip. The anterior excavation of the pronotum is rugose, and its hinder margin forms a slight tubercle on each side. The basal joint of the middle and hind tarsi is dilated and roughened.

Length, 14–17 mm.; breadth, 8–10 mm.

S. INDIA: Nilgiri Hills, 2500–3500 ft. (*H. L. Andrewes*, Oct.).

Type in Dr. J. J. Gillet's collection.

192. **Onthophagus manipurensis.** (Plate XIII, figs. 7, 8.)

Onthophagus manipurensis Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 426.

Black, with the antennæ and palpi orange, moderately shining, but sometimes with the elytra partly or entirely opaque.

Very broadly oval, compact and convex, the lower surface thinly clothed with dark reddish hair. The *head* is transversely rugose, with the vertex smooth and shining and produced backward, and the *clypeus* a little produced in front. The *pronotum* is coarsely rugulose at the sides and fairly closely punctured in its median part, the basal part smooth except in the middle. The region just behind the head is a little hollowed and its hinder margin bears a blunt tubercle on each side of the middle. The pronotum is entirely margined, the front margin is very broad in the middle, the front angles are rather blunt, the lateral margins bisinuate, and the base distinctly but obtusely angulate in the middle. The *elytra* are finely striate, the striæ not distinctly punctured, the intervals almost flat, the dorsal ones scarcely and the lateral ones distinctly but rather finely punctured. The *pygidium* is closely and finely punctured. The *metasternum* is finely punctured at the sides and smooth in the middle. The basal joint of the antenna has a finely serrate carina in front.

♂. The clypeus is produced to a rather sharp angle and a little recurved, the frontal carina is replaced by a pair of strongly elevated tubercles, and the vertex is produced backward as a broad smooth lamina, angulate on each side and terminating in a slender recurved finger-like process. The pronotum is more deeply excavated in front than in the female and nearly smooth in the excavation.

♀. The clypeal margin is parabolic and not reflexed, there is a straight frontal carina, not elevated at the ends, and the vertex bears a vertical narrow transverse lamina, a little emarginate at the summit. The hollowed anterior part of the pronotum is rather closely granular. The basal joint of the middle and hind tarsi is dilated and rough beneath.

In a small male specimen the clypeus has the parabolic outline usually distinctive of the female, the frontal tubercles are feeble and almost united, and the posterior prolongation of the head is very short and blunt.

Length, 14–20 mm.; breadth, 8–10 mm.

ASSAM: Manipur (*W. Doherty*); Garo Hills, above Tura, 3500–3900 ft. (*S. Kemp*, July, Aug.). BURMA: Kolaw, S. Shan States, 4000 ft. (*F. M. Mackwood*, April).

Type in the British Museum.

M. Boucomont (Faune Ent. Indoch. 1921, p. 40) has treated this as a variety of *O. rubricollis*, but there are numerous slight differences, apart from the different coloration, which are constant throughout the considerable number of specimens of both forms which I have examined. In particular the head of the male bears a pair of tnbercles instead of a carina and the elytra are less strongly striate and punctured.

193. Onthophagus rubricollis.

Onthophagus rubricollis Hope,* Gray's Zool. Misc. 1831, p. 22; Redt., Hügel's Kaschmir, iv, 2, 1848, p. 531, pl. 24, fig. 5.

Black and shining, with the pronotum (except the extreme outer margins and the two anterior tubercles), the middle of the metasternum, and the four posterior femora beneath (except the outer margins) blood-red. The antennæ and mouth-organs are bright yellow, and the lower surface of the body is thinly clothed with dark reddish hair.

Very broadly oval, compact and convex. The *head* is transversely rugose, with the *clypeus* produced in front, the forehead bearing a short, straight carina, and the vertex smooth, produced backward and recurved. The *pronotum* is fairly strongly punctured, the punctures rugose in front and almost absent near the base on each side, and there is a tubercle on each side a little behind the front margin. The pronotum is completely margined, the front margin very broad in the middle, the front angles are blunt, the lateral margins nearly straight in front and sinuate behind, and the base obtusely angulate in the middle. The *elytra* are strongly striate, with the intervals slightly convex and finely and moderately closely punctured. The *pygidium* is closely and rather less finely punctured, the *metasternum* clothed at the sides with long close hair and smooth in the middle. The basal joint of the antenna has a finely serrate anterior edge.

♂. The clypeus is produced to a point and recurved in front, the frontal carina is rather feebly elevated, and the vertex is produced backward as a broad lamina, angular on each side and terminating in a recurved finger-like process. The pronotum is rather deeply hollowed between the two tubercles.

♀. The clypeal margin is not pointed nor reflexed, the frontal carina is more elevated at each end than in the middle, and the vertex bears an erect transverse process, truncate at the summit. The pronotum is only slightly hollowed between the two tubercles. The basal joint of the front and middle tarsi is dilated and rough beneath.

Length, 13–18 mm.; breadth, 7·5–10 mm.

NEPAL (*Maj.-Gen. Hardwicke*). ASSAM: Upper Shillong (*T. Bainbrigge Fletcher*, June); Maflong, Khasi Hills, 5900 ft. (*S. Kemp*, Sept.). SIKKIM: Sitong, near Mangpu, 3800–4000 ft. (*S. Kemp*, July). U. PROV.: Gori Valley, W. Almora, Kumaon, 4000 ft. (*H. G. Champion*); Muktesar, 7500 ft. (*T. Bainbrigge Fletcher*, Sept., Aug.).

Type in the British Museum.

Found in cow-dung.

Although extremely close structurally to *O. manipurensis* and *nilgirensis*, the peculiar red and black colouring renders this a quite unmistakable species. Occasional specimens are found with the elytra as well as the pronotum red, perhaps from immaturity, and the British Museum series includes one specimen in which there is a large black patch at the base of the pronotum; but I have seen none intermediate between *rubricollis* and the other two forms.

194. **Onthophagus vividus.** (Plate I, fig. 6.)

Onthophagus vividus Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 428.

Deep blue or green, usually with the head and pronotum fiery red (golden-red at the sides of the latter) and the elytra dark blue, but the head and pronotum or the whole upper surface may be bright metallic green. The front of the clypeus is black and the antennæ are orange.

Very broadly oval, compact, and convex. The *clypeus* is transversely rugose and produced in front, the forehead punctured or granular, and the *pronotum* covered, except in its posterior median part, with close oval granules. There is a feeble median impression in front, bordered on each side by a slight rounded tubercle. The front angles of the prothorax are rather sharp, the sides nearly straight in front, and the base has a distinct but obtuse angle in the middle. The posterior median part is more or less smooth, extremely brilliant. The *elytra* are subopaque and very finely striate, with the intervals flat and very minutely, numerously and rather evenly punctured. The *pygidium* is rather strongly punctured, the lower surface of the body bears a thin clothing of reddish hairs, the *metasternum* is smooth in the middle and irregularly punctured at the sides.

♂. The curved carina between the clypeus and forehead is indistinct or absent, the clypeus is rugosely punctured and narrowly bordered with black, and the vertex bears a short, erect, pointed horn.

♀. There is a well-marked curved carina between the clypeus and forehead, the former is more produced than in the male, closely transversely rugose and black, except the posterior border, and the vertex bears a very short blunt tubercle.

Length, 11–16 mm.; breadth, 6·5–8·5 mm.

S. India: Nilgiri Hills (*H. L. Andrewes*); Bangalore; Nandidrug (*Dr. T. V. Campbell*); Jawalagiri, N. Salem (Oct.); Peermade (Sept.), Trivandrum, Travancore.

Type in the British Museum.

According to a note made by Mr. M. J. Walhouse in 1861 this insect is only found in carcases.

195. Onthophagus martialis.

Onthophagus martialis Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 234.

Black, opaque above, with the head coppery and a very feeble coppery lustre upon the rest of the upper surface, and each elytron decorated with six small yellow spots, one on the second interval just beyond the base, one on the fourth interval at the base, one just behind the shoulder, one near the middle of the outer margin, and two at the hind margin. The antennæ are black, the mouth-organs yellow, and the upper surface and pygidium are clothed with fairly long erect greyish setæ.

Oval and not very convex. The *head* is not broad, the ocular lobes are almost parallel-sided, and the *clypeus* is produced. The *pronotum* is densely rugose, the sculpture becoming rather coarser and less deep in the posterior part, where large shallow pits are usually distinguishable. The front angles are produced and fairly sharp, the lateral margins nearly straight in front and feebly sinuate behind, the hind angles obtuse but distinct, and the base obtusely angular in the middle. The *elytra* bear broad and deep double-walled striæ, with large distant punctures in the striæ, the intervals flat, opaque, and strongly but not densely granulate. The *pygidium* is shining, strongly but rather sparingly puuctured. The metasternal shield is smooth in the middle, and its sides and those of the *metasternum* are strongly but not very closely punctured.

♂. The head is smooth but not shining, with large and small punctures intermixed, except in the middle, where the punctures are obsolete. The clypeus is rather narrow in front, with its margin entire and strongly reflexed. The clypeus and forehead are not distinctly separated and the hind margin is produced backward into a flat broad plate with a concave edge, the angles produced into short parallel horns curving gently upward. The anterior part of the pronotum is a little depressed on each side of the middle, leaving a slight rounded prominence between. The front legs are a little elongate.

♀. The head is rather coarsely rugose, with the clypeus deeply cleft and bidentate in front, and separated from the forehead by a slight curved carina.

Length, 7–8 mm.; breadth, 4·5–5 mm.

CEYLON: Balangoda; Urugala (*G. M. Henry*, April); Kandy (*G. E. Bryant*, July; *E. E. Green*, April–July, Nov.); Peradeniya (*E. E. Green*, Oct.); Rangala (*G. M. Henry*, April).

Type in M. Boucomont's collection.

The pale elytral markings vary greatly in this species. They may be so reduced as to be quite inconspicuous, and, on the other hand, I have seen a specimen in which the inner

basal spot extends in one direction almost to the suture and in the other unites by a diagonal extension with the median lateral spot.

Key to Group 13 (marginalis *group*).

1	(6)	Elytra not uniformly coloured.	
2	(5)	Elytra irregularly speckled.	
3	(4)	Elytra punctured	*marginalis* Gebl., p. 247.
4	(3)	Elytra granular	*sutlejnensis* Splich., p. 249.
5	(2)	Elytra longitudinally striped	*zebra*, sp. n., p. 249.
6	(1)	Elytra uniformly coloured.	
7	(10)	Black.	
8	(9)	Extremely smooth above	*atropolitus* d'Orb., p. 250.
9	(8)	Not extremely smooth above ...	*occipitalis* Lansb., p. 251.
10	(7)	Blue, green, or coppery	*spinifex* F., ♂, p. 200.

O. spinifex has already been described on p. 200, but has been included here also, well developed males differing extremely from other examples.

O. marginalis has also been included in the key to Group 22, as the puncturation of the pronotum is sometimes almost simple.

196. **Onthophagus marginalis.**

Copris marginalis Gebl., Mém. Mosc. v, 1817, p. 315.
Onthophagus marginalis d'Orb., L'Abeille, xxix, 1898, p. 180.
Onthophagus marmoratus Ménétr., Cat. Rais. 1832, p. 176.

Black and shining, with the elytra pale yellow, mottled all over with numerous black specks, irregularly and asymmetrically coalescing, the sutural and apical margins generally black. There may be a thin and inconspicuous clothing of yellowish setæ upon the head, the sides of the pronotum and of the body beneath.

Oval, moderately convex, with the *clypeus* produced (♂) or nearly semicircular (♀). The *pronotum* is retuse and smooth in front, finely but distinctly and rather evenly punctured dorsally, the punctures partially coalescing and becoming rugose anteriorly. There is a light median groove in the posterior part, the front angles are slightly produced but blunt, there is a fine entire margin, and the base is rounded and scarcely angulate. The *elytra* are finely but distinctly striate, with the intervals rather flat and finely and sparingly punctured. The *pygidium* is distinctly but not very closely punctured. The meso-metasternal suture is straight and entire, and the front part of the *metasternum* is rather abruptly depressed.

♂. The head is smooth, with a few punctures in the middle, the clypeus unevenly punctured, produced, truncate, and reflexed at the tip, the vertex produced backward in the same plane, as a smooth, broad, quadrate lamina, the hind margin of the lamina bearing in the middle a slender recurved

horn. The anterior part of the pronotum is angularly excavated in front. The front tibia is rather longer and the teeth feebler than in the female.

♀. The head is rugosely punctured, with the clypeus scarcely produced, its front margin a little reflexed and feebly excised. There is a sharply elevated, nearly straight frontal carina, and the vertex is elevated into a sharp carina of which the ends bear a pair of erect parallel horns. The front of the pronotum is vertical, with a slight prominence in the middle. The front tibiæ are very short and broad.

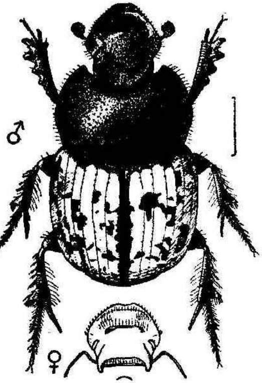

Fig. 26.—*Onthophagus marginalis*, ♂, and head of ♀.

In small females the posterior cephalic carina is without horns, and the corresponding slight thoracic prominence is also wanting.

Length, 7–11 mm. ; breadth, 4·5–6 mm.

KASHMIR : Kurama, Lolab Valley, 5500 ft. (*C. F. C. Beeson*, May). PUNJAB : Simla ; Jhelum, 5000 ft. UNITED PROV. : Arakot, Chakrata, 4000 ft. (*B. M. Bhatia*, June) ; Kotbhai, Giri River, 6500 ft. (*C. F. C. Beeson*, May) ; Dhobi Ghat, Mussoorie (*M. Bose*, April). NEPAL. AFGHANISTAN. MANCHURIA. SIBERIA. PERSIA. ARABIA. CAUCASUS.

Very abundant in horse- and cattle-dung.

Type in M. René Oberthür's collection ; that of *marmoratus* in the Leningrad Academy of Sciences.

197. **Onthophagus sutleinensis.**

Onthophagus sutleinensis Splich., Deutsche Ent. Zeits. 1910, p. 567.
Var. *marxi* id., op. cit. 1912, p. 467.

Black, subopaque, with a slight coppery lustre upon the head, pronotum, and pygidium, the elytra yellow, marbled with black, and the suture black. The upper surface is clothed, conspicuously upon the head and pronotum and very inconspicuously upon the elytra, with pale setæ. The antennæ are dark.

Oval, compact, and moderately convex. The *head* is rather narrow, with the *clypeus* a little produced, the margin strongly reflexed in front and very feebly bilobed. The *pronotum* is closely punctured in its median and basal part and rugose laterally, with a smooth front margin. The front angles are a little produced, but not sharp, the sides are nearly straight in front, lightly sinuate behind, and the base is finely margined and very obtusely angular in the middle. The *elytra* are finely striate, with the intervals flat and finely irregularly granular. The *pygidium* is opaque and very finely and sparsely punctured. The *metasternum* has a fine median groove and is strongly and irregularly punctured at the sides and base.

♂. The head is shining, feebly rugosely punctured, without carinæ, the posterior part produced backward as a triangular plate, the apex of which curves upward as a short slender horn, which is minutely bifurcate at the tip. The pronotum is a little hollowed in front, and the upper margin of the declivity bears two slight tubercles a short distance apart. The front tibia is a little elongate.

♀. The head is opaque, the clypeus closely rugose, separated by a strong feebly curved carina from the finely punctured forehead, and there is a second very strongly elevated straight carina between the eyes. The upper margin of the prothoracic declivity is a little produced forward in the middle as a slightly bifurcate process.

Length, 8–9 mm.; breadth, 5·5–6 mm.

PUNJAB: Bashahr. KASHMIR: Rajpur Rampur (*E. C. Selous*). TIBET FRONTIER: R. Sutlej.

Type in the collection of the describer.

198. **Onthophagus zebra,** sp. n.

Shining coppery or deep metallic green or blue, the elytra bright yellow, with the inner and outer margins and the 3rd, 5th, and 7th intervals, except at their extremities, black. The antennal footstalk, tarsi, and mouth-organs are red, and the upper surface is clothed with very fine grey hairs.

Oval and moderately convex. The *head* is not very broad, rounded at the sides, with the *clypeus* asperately punctured, its front margin straight or scarcely perceptibly sinuate in the middle, and separated by a rounded carina from the sparsely punctured forehead. The *pronotum* is closely, evenly and rather finely punctured, the punctures becoming asperate in front. The front angles are slightly produced, but not very sharp, the sides nearly straight in front, very feebly sinuate behind, the hind angles obsolete, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and finely asperately punctured. The *pygidium* is strongly but not closely punctured. The metasternal shield bears fine scattered punctures, which are a little more numerous at the sides of the *metasternum*.

♂. The head bears a transverse lamina inclined slightly backward between the eyes and produced into a short, sharp horn in the middle. The pronotum is nearly vertical and almost smooth in front, and the upper edge of the declivity has two very slight prominences placed a little apart. The front tibia is very slightly elongate.

♀. The head has a strong, straight carina between the eyes, and the pronotum has a fairly broad prominence immediately behind the front margin.

Length, 5–6 mm. ; breadth, 3–3·5 mm.

C. INDIA : Mhow (*Selous*). BOMBAY : Belgaum (*H. E. Andrewes*).

Type in the British Museum.

199. **Onthophagus atropolitus.**

Onthophagus atropolitus d'Orb., Ann. Soc. Ent. Fr. 1902, p. 148.

Smooth, shining black, the elytra a little less shining than the head and pronotum, and the latter with a small opaque area in the middle of the base ; the legs and lower surface pitchy red, the antennæ light red and thinly clothed with light hairs at the sides beneath.

Rather narrowly oval in shape. The *head* is subcircular, with the *clypeus* transversely rugose, its margin reflexed and entire, the forehead separated by a strong rounded carina. The *pronotum* is feebly punctured (almost unpunctured in the male), completely and finely margined, the front angles blunt, the sides nearly straight, and the base very obtusely angulate in the middle. The *elytra* are finely striate and the intervals are flat and not distinctly punctured. The *pygidium* is shining and thinly, but fairly strongly, punctured, and the sides of the *metasternum* are similarly punctured. The basal joint of the antenna has a minutely serrate carina in front.

♂. The forehead is smooth and shining, and a pair of short,

erect, and parallel horns arise between the eyes. The anterior part of the pronotum is vertical, and its upper edge forms a sharp carina. In small males the horns are replaced by a strongly elevated carina a little produced at each extremity.

♀. The *forehead* is feebly rugose and the vertex bears a straight carina. The pronotum is very finely punctured in front and has a very narrow vertical anterior margin.

Length, 8–12·5 mm. ; breadth, 4·5–7 mm.

U. Prov. : Dehra Dun (June, Aug.). Sikkim : Gopaldhara, Rungbong Valley (*H. Stevens*). Assam : Nongpoh, Khasi Hills (*D. Nowrojee*, July). Burma : Bhamo (*L. Fea*, June, July). Bengal : Singla, Darjeeling District, 1500 ft. (June).

Type in the Paris Museum.

This species was found in very great profusion at Singla by Lord Carmichael's collectors. By an unfortunate error it was originally described as a South African insect.

200. **Onthophagus occipitalis.**

Onthophagus occipitalis Lansb.,* Ann. Mus. Civ. Genova, xxii, 1885, p. 379.

Black and shining, with the antennæ and mouth-parts, and sometimes the legs and lower surface, reddish. There is a very sparse clothing of yellowish setæ upon the legs and lower surface.

Oval and not very convex. The *head* is not very wide and the *clypeus* is a little produced, its sides nearly straight and the apex feebly excised. The eyes are moderately large as seen from above. The *pronotum* is strongly and not very closely punctured, except near the front angles, where the punctures are larger and almost confluent. The front margin is vertical in the middle and more finely punctured. The front angles of the pronotum are a little produced and moderately sharp, and the sides straight in front and feebly sinuate behind, the base very gently rounded and distinctly margined. The *elytra* are fairly strongly striate, with well-marked punctures in the striæ, the intervals a little convex and very minutely and sparsely punctured, except at the sides, where the punctures are fairly strong. The *pygidium* is moderately punctured and the *metasternum* strongly but not closely at the sides and very finely and sparsely in the middle.

♂. The clypeus is well, but not closely, punctured and rather indistinctly separated from the forehead, which is very finely and sparingly punctured and produced backward as a broad plate toothed near the eye on each side, the middle part of the plate curving upward and narrowing into a broad short horn, which bifurcates at the end. The upper edge of the vertical front margin of the pronotum forms a straight sharp carina in the middle.

♀. The clypeus is rather rugosely punctured in front and is separated from the forehead by two curved carinæ placed rather close together. The hind margin of the head bears in the middle a short transverse erect lamina, feebly bilobed at its summit. The upper edge of the prothoracic declivity is produced forward a little, especially at each end, which forms a blunt tubercle, beneath which is a slight depression.

Length, 8–9 mm. ; breadth, 4·5–5·5 mm.

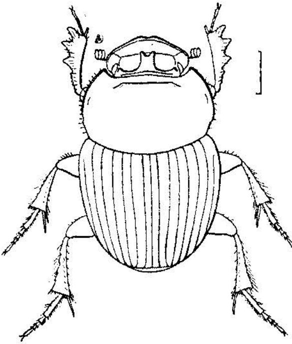

Fig. 27.—*Onthophagus occipitalis*, ♂.

BURMA : Mandalay (Feb.) ; Minhla (*Comotto*) ; Meiktila (*T. Bainbrigge Fletcher*, Aug.) ; Pakokku (*Miss Molesworth*, Sept.) ; Paungde (*G. Q. Corbett*).

Type in the Genoa Museum.

Key to Group 14 (militaris *group*).

1	(12)	Elytra decorated with pale spots or patches.	
2	(5)	Pronotum without distinct granules.	
3	(4)	Elytra decorated with small detached spots	*militaris* Bouc., p. 253.
4	(3)	Elytra decorated with large irregular patches	*lemniscatus* Gill., [p. 253.
5	(2)	Pronotum bearing distinct granules.	
6	(11)	Each elytron with four or more yellow patches.	
7	(8)	Front angles of the pronotum blunt..	*kchatriya* Bouc., p. 255.
8	(7)	Front angles of the pronotum sharp.	
9	(10)	Clypeus sharply notched	*orissanus*, sp. n., p. 257.
*10	(9)	Clypeus not sharply notched	*felix*, sp. n., p. 257.
11	(6)	Each elytron with two red patches ..	*madoqua*, sp. n., p. 258.
12	(1)	Elytra without pale spots or patches.	*violaceotinctus* Gill., [p. 259.

201. **Onthophagus militaris.**

Onthophagus militaris Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 234.

Shining black or greenish-black, with the head and pronotum dark coppery or green. The elytra are decorated with bright yellow spots as follows:—one near the middle of the basal margin, one in the humeral angle, one behind the middle of the outer margin, a minute one at the hind margin, and one in the sutural angle not reaching the margin. The antennal club is dark, the foot-stalk, the mouth-organs, and the tarsi are red, and the body is clothed above and beneath with long, erect, yellow hairs.

Oval and moderately convex, with rather long legs. The *head* is not wide, the ocular lobes are gently rounded externally, and the clypeus is sharply bidentate. The *pronotum* is coarsely punctured, most of the punctures coalescing longitudinally except in the middle. The front angles are sharply produced, the lateral margins are nearly straight in front, sinuate behind, the hind angles are distinct, and the base is strongly rounded. The *elytra* are finely striate, the striæ passing through large ill-defined punctures, the intervals bearing minute scattered granules. The *pygidium* bears fairly strong, not close, punctures. The metasternal shield is smooth in the middle and bears scattered punctures at the sides, and the sides of the *metasternum* bear a very few large punctures.

♂. The head is smooth and bears only a very few punctures. The vertex is produced backward and gives rise to a pair of outward-curving connected horns, which slope slightly upward and enclose a semicircular space. The anterior part of the pronotum is smooth and a little depressed on each side, raised and rather prominent in the middle.

♀. The head is very coarsely rugose, with a curved carina separating the clypeus and forehead.

Length, 5–7 mm.; breadth, 3–4 mm.

Ceylon: Kandy (*E. E. Green, G. Bryant*, May, June, July); Peradeniya (*E. E. Green*, April); Anuradhapura (*E. E. Green*, Nov.); Urugala (*G. M. Henry*, April); Wellawaya (*G. M. Henry*, Jan.).

Type in M. Boucomont's collection.

202. **Onthophagus lemniscatus.**

Onthophagus lemniscatus Gillet,* Ann. Soc. Sci. Brux. xliv, 1924, p. 69.

Black, not shining, the elytra decorated with irregular bright yellow markings, consisting of a large basal and a small apical patch, the former extending from the outer margin almost to the inner margin, with a small black spot in the

humeral angle, another at the base of the 5th interval, and a large black patch at the outer margin a little behind the shoulder, the apical patch irregularly arcuate, interrupted on the 5th interval and only touching the apical margin at each end.

Oval, convex, not very compact. The *head* is not very broad, rounded at the sides, with the clypeus broadly truncate at the front margin. The *pronotum* is coarsely and closely pitted, with the front angles and a small elongate patch in the middle of the dorsal surface smooth and shining. The sides are feebly sinuate before and behind the angulation, the front angles are produced, the hind angles obtuse but distinct,

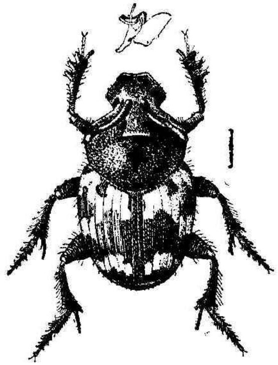

Fig. 28.—*Onthophagus lemniscatus*, ♂, and side view of head and thorax.

and the base is strongly rounded. The *elytra* are finely striate, the intervals flat and not very shining, with minute and scanty tubercles, chiefly in double rows. The 7th stria is strongly curved. The *pygidium* is shining and moderately punctured. The *metasternum* bears large scattered punctures, except in the middle, where it is smooth and shining.

♂. The head is opaque and bears scattered punctures, and the clypeus has a broadly reflexed front margin and is not divided from the forehead. The head is produced backward in the same plane, forming a flat median, more or less rectangular, lamina, broad at the base and truncate and

a little dilated at the end, with a minute erect tubercle in the middle, and an extremely slender pair of lateral horns, arising as flat diverging plates behind the eyes, produced outward and backward and doubled sharply forward as almost thread-like processes, the tips of which almost meet over the head. The front tibiæ are elongate and their teeth short.

♂ minor. The horns are short, far apart but reflexed, with the tips convergent, and united at the base by a broad lamina, which is not produced in the middle.

♀. The clypeus is shorter, coarsely rugose, and divided by a slight carina from the forehead, which is coarsely but not closely punctured. The posterior margin of the head is a little produced. The front tibiæ are short and strongly toothed.

Length, 6–7 mm.; breadth, 3·5–4 mm.

S. INDIA: Sims Park, Coonoor, 6000 ft. (*R. B. S. Sewell*; *F. H. Butcher*, June).

Type in the Calcutta Museum.

The very remarkable development of the horns of the male in the type-specimen is astonishing in so small an insect. All the other males which I have yet seen have the horns poorly developed, and it may be that the highly developed phase is only of occasional occurrence.

203. **Onthophagus kchatriya.**

Onthophagus kchatriya Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 233.

Shining black, with the head bright metallic green or coppery, the pronotum deep blue or green, and each elytron decorated with bright yellow patches, as follows:—one at the shoulder, one near the middle of the outer margin, one in the apical angle, a small one between the last two, and a large double one near the base and suture. The antennæ, mouth-organs and tarsi are red, and the body is entirely clothed with moderately long pale hairs, erect upon the upper surface.

Broadly oval, compact, and highly convex. The *head* is very smooth and not very broad, the ocular lobes are gently rounded and very little dilated in front of the eyes, the *clypeus* is short, its front margin rounded and nearly straight in the middle. The *pronotum* bears fairly strong, not very closely aggregated granules, except in front. The front angles are produced but rather blunt, the lateral margins straight in front, strongly sinuate behind, the hind angles obtuse but distinct, and the base strongly rounded. The *elytra* are finely striate, the intervals flat and bearing scattered asperate punctures. The *pygidium* is sparingly but distinctly punctured, the metasternal shield is very smooth in the middle,

finely and sparsely punctured at the sides, and the sides of the *metasternum* are asperately punctured.

♂. The head is very smooth, with only a few punctures upon the clypeus. The posterior margin is produced backward as a broad lamina, the outer angles of which form a pair of outward- and upward-curving horns, very broad at the base and slender at the tips. The anterior part of the pronotum is flattened and entirely smooth and shining. In small males the horns are very short, the smooth area of the pronotum is narrow, and a pair of well-marked tubercles are present at the hind margin of that area.

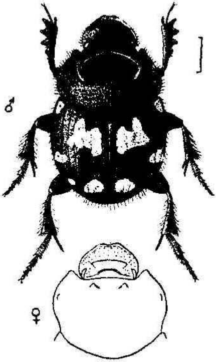

Fig. 29.—*Onthophagus kchatriya*, ♂, and anterior part of ♀.

♀. The clypeus is transversely rugose and divided by a strong rounded carina from the smooth forehead. The vertex bears a strongly elevated rectangular lamina. The pronotum has a narrow smooth margin, and there is a pair of very strong rounded tubercles, separated by a smooth depression, at the posterior edge of this smooth margin.

Length, 5·5–7 mm.; breadth, 3·5–4 mm.

S. India: Nilgiri Hills (*H. L. Andrewes*); Bangalore; Yercaud, Salem District (*P. V. Isaac*, May); Elenjeri, Nilambur, Madras (*S. N. Chatterjee*, July); Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May).

Type in M. Boucomont's collection.

204. ***Onthophagus orissanus***, *sp. n.*

Black, shining, with the head, pronotum, pygidium, and lower surface dark coppery or metallic green, each elytron decorated with a yellow spot upon the shoulder, one, sometimes divided into two, near the suture at the base, one near the middle of the outer margin, and two near the posterior margin. The antennæ, mouth-organs and tarsi are red, and the upper surface and pygidium are fairly closely clothed with long, erect, yellow hairs.

Oval, deeply-waisted, and moderately convex. The *head* is not very wide, very smooth, with only a few large punctures, the sides are gently rounded, and the *clypeus* is produced, deeply notched, and sharply bilobed in front. The *pronotum* is fairly closely set with strong granules and asperate punctures, with a small smooth patch near the middle. The front angles are rather sharply produced, the lateral margins straight in front and feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, and the intervals are flat and bear fine granules, mostly in double rows. The *pygidium* bears large but not very numerous punctures, the metasternal shield is strongly punctured at the sides and smooth in the middle, and the sides of the *metasternum* are strongly but sparsely punctured.

♂. The posterior margin of the head is produced into a pair of backwardly directed horns, united by a curved carina and enclosing a half-circle, the horns moderately broad at the base and very slender at the end. The pronotum has a rounded hump between the horns, smooth and sloping in front.

♀. The clypeus and forehead are divided by a curved carina, and there is a straight carina at the posterior margin of the head.

Length, 6–6·5 mm.; breadth, 4 mm.

ORISSA: Barkul (*F. H. Gravely*, Aug.).

Type in the British Museum.

The type specimen is without a precise locality.

205. ***Onthophagus felix***, *sp. n.*

Deep coppery, very shining, with the elytra black and each ornamented with four or more bright yellow patches, viz., an irregular one just beyond the base and usually attaining it at the fourth interval (this patch is sometimes disrupted), one at the shoulder, one past the middle of the outer margin, and two at the posterior margin. The antennæ, mouth-organs, and tarsi are reddish, and the upper surface is clothed with moderately long, erect, pale hairs.

Oval and very convex. The *head* is not very broad. The sides are gently rounded and the front margin is feebly

excised. The *pronotum* is rather finely, not very closely, granular, the granules being replaced by fine punctures at the base. The front angles are produced and acute, the lateral margins feebly sinuate in front and behind, the hind angles very blunt, and the base very obtusely angular in the middle. The *elytra* are finely striate, the intervals flat and sparsely granular or asperate. The *pygidium* is fairly strongly and closely punctured and the *metasternum* bears a very few scattered punctures at the sides and in the middle.

♂. The head is very smooth and shining, with only a few large punctures at the sides, the forehead is not separated from the clypeus, and the posterior part is produced backward as a flat transverse lamina, of which the angles are drawn out into backwardly directed convergent horns. The anterior margin of the pronotum is sloping and very smooth.

♀. The clypeus is coarsely transversely rugose, separated by a strong curved carina from the nearly smooth forehead, and the posterior margin of the head is reflexed and produced in the middle into a truncate process. The pronotum has a slight rounded prominence just behind the front margin.

Length, 6 mm.; breadth, 3·5 mm.

CHOTA NAGPUR: Nowatoli (*Father Cardon*, Oct.).

Type in the British Museum.

This species was taken in numbers by Father Cardon, and a few examples have been sent to me by M. René Oberthür.

206. **Onthophagus madoqua**, sp. n.

Black and shining, with the head coppery, the pronotum deep golden-green, and each elytron decorated with a red patch at the shoulder and a red hind margin. The upper surface is clothed (not very closely) with erect pale setæ.

Oval and convex. The *head* is short and broad, with the sides feebly curved, the *clypeus* smooth in front, with its margin strongly reflexed, obtusely excised in front and nearly straight on each side, the forehead separated by a gently curved carina and sparingly punctured. The *pronotum* is strongly and evenly but not closely punctured, the punctures becoming asperate in front. The front angles are a little produced but not very sharp, the lateral margins feebly sinuate in front and behind, the hind angles very obtuse, and the base strongly rounded. The *elytra* are very finely striate, the interstices flat and rather regularly and not very finely asperate-punctate. The *pygidium* is shining and fairly strongly punctured. The metasternal shield bears irregularly scattered punctures, and the sides are strongly but not closely punctured.

♂. The posterior part of the clypeus is fairly strongly but not closely punctured, the clypeo-frontal carina is feeble, and

the vertex of the head bears a pair of quite separate, straight, erect and parallel horns. The pronotum is smooth in front, where it slopes steeply but not abruptly.

♀. The clypeus is rugosely punctured behind, the forehead is separated by a strong carina, and there is a second strong carina between the eyes. The pronotum bears two short transverse prominences just behind the middle of the front margin.

Length, 4–5 mm. ; breadth, 3 mm.

S. INDIA : Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

207. **Onthophagus violaceotinctus.**

Onthophagus violaceotinctus Gill.*, Ann. Soc. Sci. Brux. xliv, 1925, p. 231.

Bright metallic blue or greenish-blue, with the antennæ and tibiæ black and the tarsi deep red, and clothed above and beneath with long but not very close erect whitish hairs.

Oval, rather deeply waisted, and highly convex. The *head* is flat, densely rugosely punctured, not very wide, uniformly rounded at the front and sides, almost imperceptibly produced in the middle of the front margin, with a minute tubercle in the middle. The *pronotum* is strongly and densely punctured, the punctures more or less coalescing and becoming finely rugose at the sides. The front angles are acute, the sides nearly straight in front, feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the intervals flat and irregularly granular or rugose. The *pygidium* is rather roughly but not closely punctured, the *metasternum* distinctly but unevenly in the middle and rather more closely at the sides.

♂. The spurs of the front tibia are strongly bent and acutely pointed.

Length, 6 mm. ; breadth, 3·5 mm.

S. INDIA : Horsleykonda, 3000–4000 ft., Chittoor District (Sept.).

Type in Dr. J. J. Gillet's collection.

Group 15.

This contains only a single peculiar species.

208. **Onthophagus discedens.** (Plate XII, fig. 8.)

Onthophagus discedens Sharp, Col. Hefte, xiv, 1875, p. 49 ; Bouc., Ann. Soc. Ent. Fr. 1914, p. 270.

Shining black above and beneath, with the antennæ reddish, except the two terminal joints, which are pale yellow. The sides of the body beneath are thinly clothed with pale hair.

Rather long and narrow, very smooth, moderately convex. The *head* is broad, flat, and rugose, the rugosity passing into granulation in front and into vague puncturation behind. The front margin is reflexed on each side and deeply excised in the middle, and from the middle of the excision projects a short but sharp and prominent process. The *pronotum* is extremely smooth, with sparse and almost imperceptible punctures, except at the sides, where they are distinct but few and irregular, changing in the anterior part to fairly close and not very fine granules. The pronotum is fairly broad anteriorly, its front angles are very broadly rounded, and the base is rather narrow, rounded, with a very obtuse angle in the middle. The *elytra* are strongly rounded at the sides, rather narrow at the base, moderately deeply striate, the striæ feebly punctured and the intervals finely irregularly punctured. The *pygidium* is strongly punctured. The metasternal shield is feebly punctured, shallowly channelled along the middle and strongly elevated in front, forming a bluntly rounded process, which bears rather long hairs. The sides of the *metasternum* are asperately punctured. The front tibia is armed externally with four strong sharp teeth.

The two sexes are alike.

Length, 8–17 mm.; breadth, 5–9 mm.

BENGAL: Singla, 1500 ft., Darjeeling District (*Lord Carmichael's collector*, June). BURMA: Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.). SIKKIM: Gopaldhara, Rungbong Valley (*H. Stevens*). U. PROV.: Dehra Dun (*O. C. Ollenbach*, July; *G. D. Bhasin*, Sept.). S. INDIA: Nilgiri Hills (*H. L. Andrewes*). SIAM. INDO-CHINA. MALAY PENINSULA. BORNEO.

Type in M. René Oberthür's collection.

Group 16.

This also contains only a single species.

209. **Onthophagus quæstus.**

Onthophagus quæstus Sharp, Col. Hefte, xiv, 1875, p. 55.

Black, smooth and shining, with the antennæ and mouth-organs yellow.

Elongate-oval, highly convex, and deeply waisted. The *head* is short, with a very short and truncate, slightly reflexed lobe in the middle of the front margin, the sides bluntly angular before the eyes. The *clypeus* is divided from the forehead by a curved carina and there is a short straight posterior carina. The *pronotum* is fairly strongly and closely punctured at the sides, finely and less closely upon the remaining surface. The front angles are blunt, the sides almost straight in front, sinuate behind, and the base is very obtusely angular

in the middle. The *elytra* are finely striate, the striæ punctured, and the intervals flat and finely and numerously punctured. The *pygidium* is fairly strongly and closely punctured. The *metasternum* is vertical in front and compressed laterally, forming a bluntly pointed process. It is moderately closely and finely punctured, except at the sides, where the punctures are less close. The teeth of the front tibia are stout and blunt.

♂. The clypeus is finely punctured and shining and the frontal carina is feeble. The front tibia is strongly curved and more elongate than that of the female. The terminal spur is stout and blunt.

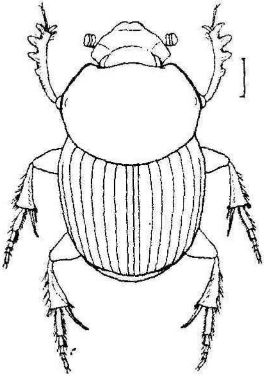

Fig. 30.—*Onthophagus quæstus*, ♂.

♀. The clypeus is closely rugose and the frontal carina is strong. The front tibia is broad and the terminal spur sharp.

Length, 5–7 mm.; breadth, 3·5–4·5 mm.

BENGAL: Berhampore (*E. T. Atkinson*). BIHAR: Pusa (*T. Bainbrigge Fletcher*, Aug.); Chapra (*Mackenzie*). U. PROV.: Fyzabad (*R. W. G. Hingston*). C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, July). BOMBAY: Bandra (*Dr. Jayakar*). S. INDIA: Madras City (*F. H. Gravely*); Sappal, Palghat, Malabar Dist. (*J. C. M. Gardner*, May). CEYLON: Koggala (*E. E. Green*, Nov.); Vavuniya, N. Prov. (*G. M. Henry*, Dec.).

Type in M. René Oberthür's collection.

Found by Mr. D'Abreu feeding upon a dead crab, and, on another occasion, "in putrid flesh."

Key to Group 17 (amphicoma *group*).

Clypeus emarginate; pronotum not extremely convex	*amphicoma*, Bouc., [p. 262.
Clypeus not emarginate; pronotum extremely convex	*vulpinus*, sp. n., p. 262.

210. **Onthophagus amphicoma.**

Onthophagus amphicoma Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 239.

Dark coppery or metallic green, very shining, with the legs, antennæ and mouth-organs red, the lower surface almost black and the elytra bright yellow, with black sutural and outer margins and black patches, consisting of an oblique irregular stripe from the basal to the lateral margin, and an irregularly oval postmedian patch, almost or quite united with the oblique stripe and with the sutural border, which is dilated behind it. There is a sparse clothing of long, erect, yellow hairs above and beneath.

Oval and not very convex. The *head* is coarsely and not very numerously punctured, not broad, the sides are rather feebly rounded, the *clypeus* moderately long and gently excised in front, smooth in the middle and fairly closely punctured at the margins. There is a straight, fairly strong carina between the eyes. The *pronotum* bears very large and rather sparse punctures, the front angles are rather blunt, the sides nearly straight in front, feebly sinuate behind, and the base is strongly rounded. The *elytra* each bear five fine striæ, the 6th is incomplete and the 7th wanting. The striæ contain minute and distant punctures, the intervals are slightly convex and (except the sutural one, which has a row of fine tubercles, and the 2nd, which has one whole and one half-row of punctures) have each two rows of fairly strong punctures. The sides are strongly and irregularly punctured. The *pygidium* is rather strongly punctured, the metasternal shield very sparsely and finely, and the sides of the *metasternum* very strongly and moderately closely.

Length, 4 mm.; breadth, 2·5 mm.

S. India: Mahé, Malabar Coast (*M. Maindron*); Nilgiri Hills (*H. L. Andrewes*); Travancore.

Type in M. Boucomont's collection.

M. Boucomont has a specimen (presumably a male) with two short united horns upon the vertex, but the type (believed by him to be a male) is without these. The species is very easily recognized by the absence of the humeral stria (the 7th) upon the elytra.

211. **Onthophagus vulpinus**, sp. n.

Coppery or metallic green, very shining, with the elytra black, each with a bright yellow spot on the shoulder, a quadrate

or transverse patch near the suture and the base of the elytron, and a narrow posterior marginal patch. The front part of the head, the antennæ, mouth-organs, front tibiæ, and the tarsi are red, and the upper surface is clothed with long, erect, yellow hairs.

Oval, compact, and very convex. The *head* bears only a very few large but scattered punctures. It is not very broad, the ocular lobes are rounded at the sides, the *clypeus* is almost straight in the middle of the front margin, and there is a strong carina between the eyes. The *pronotum* is very strongly, rather evenly but not closely, punctured. The front angles are not sharp, the lateral margins are nearly straight in front and feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the striæ rather remotely punctured. The second stria is strongly curved and the seventh indistinct, and the intervals are rather sparingly but not very finely asperately punctured. The *pygidium* is shining and strongly punctured. The metasternal shield is smooth along the middle line and sparsely but fairly strongly and evenly punctured on each side, and the sides of the *metasternum* are also rather evenly and strongly, but not closely, punctured.

♂. The clypeus is smooth and not distinctly separated from the forehead.

♀. The clypeus is lightly rugulose and separated by a strong feebly curved carina from the forehead. The posterior carina is elevated into a sharp point at each end.

Length, 4·5 mm.; breadth, 3 mm.

ASSAM: Patkai Hills (*W. Doherty*). BURMA: Momeik (*W. Doherty*).

Type in the British Museum.

Key to Group 18 (gemma *group*).

1	(10)	Upper surface bearing fine setæ.	
2	(9)	Front tibia armed with four teeth.	
3	(8)	Vertex bearing a transverse ridge.	
4	(5)	Pronotum unevenly punctured	*gemma* Sharp, p. 264.
5	(4)	Pronotum rather evenly punctured.	[p. 264.
6	(7)	Clypeus not distinctly bidentate	*lilliputanus*, Lansb.,
7	(6)	Clypeus distinctly bidentate	*solidus*, sp. n., p. 265.
8	(3)	Vertex bearing two tubercles........	*tritinctus* Bouc., p. 266.
9	(2)	Front tibia armed with three teeth ..	*trochilus*, sp. n., p. 266.
10	(1)	Upper surface without hairs or setæ.	
11	(12)	Head and pronotum metallic; elytra finely striate	*lapillus*, sp. n., p. 267.
12	(11)	Entirely black; elytra deeply striate.	
13	(14)	Pronotum very convex, evenly punctured........................	*mauritii* Bouc., p. 267.
14	(13)	Pronotum not very convex, unevenly punctured....................	*rana*, sp. n., p. 268.

212. Onthophagus gemma.

Caccobius gemma Sharp, Col. Hefte, xiii, 1875, p. 52.
Onthophagus lilliputanus, var. *carbunculus* Bouc., Bull. Soc. Ent. France, 1921, p. 46.

Black and shining, with the head and prothorax bright golden-red, the antennæ and mouth-organs yellow, and the legs rust-red, the upper surface bearing sparse and very minute pale setæ.

Minute, broadly oval, compact and convex. The *head* is short but not very broad, with the sides rounded, the clypeal margin gently excised in the middle, the *clypeus* rugosely punctured in front, sparingly punctured behind, with a short transverse elevation in the middle, and separated from the very sparsely punctured forehead by a curved carina. There is no posterior carina. The *pronotum* is sparsely and irregularly, but very distinctly, punctured, with extremely minute punctures interspersed. The front angles are sharp, the sides straight in front, sinuate behind, and the base rounded. The *elytra* are finely striate, the 7th stria straight and parallel with the 6th, the intervals flat and distinctly and fairly numerously punctured, most of the punctures forming double rows. The *pygidium* is finely and sparingly punctured. The *metasternum* has a very few minute scattered punctures in the middle and larger and more numerous punctures at the sides.

The two sexes are alike.

Length, 3·5–4 mm. ; breadth, 2·5 mm.

BENGAL : Buxar Duars (*D. Nowrojee*). S. INDIA : Madras. CEYLON : Hambantota (*H. P. Green*, Jan.).

Type in M. René Oberthür's collection.

213. Onthophagus lilliputanus.

Onthophagus lilliputanus Lansb., Notes Leyd. Mus. v, 1883, p. 69 ; Bouc., Bull. Soc. Ent. France, 1921, p. 46.

Black and shining, usually with the head coppery, the pronotum metallic green, and the metasternum and femora more or less suffused with metallic lustre. The antennæ and mouth-organs are yellow and the upper surface of the body is thinly clothed with fine pale setæ. The shoulders of the elytra have sometimes a rather ill-defined red patch.

Broadly oval, compact, and convex. The *head* is short, with the sides strongly rounded in front of the eyes, and the clypeal margin very feebly or scarcely at all emarginate in the middle. The *clypeus* bears a short transverse elevation in the middle, and is rugosely punctured in front and sparsely punctured behind. There is a nearly straight carina between the eyes, and behind it the head is sparingly punctured. The *pronotum* is rather evenly but not closely punctured. The

front angles are sharp, the sides straight in front and feebly sinuate behind, and the base strongly rounded. The *elytra* are finely striate, the 7th stria straight and parallel with the 6th, and the intervals flat and not very finely nor sparsely punctured. The *pygidium* is moderately strongly and closely punctured. The *metasternum* bears only a few fine scattered punctures upon the shield and at the sides.

The two sexes are alike.

Length, 3·5–4·5 mm.; breadth, 2·5–3·5 mm.

KASHMIR: Sonamarg, 8600 ft. (*T. R. D. Bell*). BENGAL: Rungpur (*M. O. T. Iyengar*, Nov.). PUNJAB: Theog, Simla Hills, 7600 ft. (*S. N. Chatterjee*, Sept.). U. PROV.: Mussoorie, 6000–7000 ft. (*Col. Harcourt*, July); Kalsi, Jumna R. (*M. Cameron*, May). BOMBAY. MADRAS: Barkuda I., L. Chilka, Ganjam District (*N. Annandale*, June, Sept.); Kanara (*T. R. D. Bell*); Coimbatore (July). BURMA. JAVA. BORNEO. PHILIPPINE Is.

Type in M. René Oberthür's collection.

Found beneath a dead bat by Dr. Annandale.

214. **Onthophagus solidus**, sp. n.

Black, rather shining, the upper surface suffused with a slight greenish lustre, and the head and the anterior part of the pronotum bright coppery. The antennæ are orange and the upper surface bears a thin clothing of fine greyish hairs.

Oval, rather deeply waisted, and highly convex. The *head* is rather broad, distinctly but not strongly bidentate in front, strongly rounded at the sides, with the *clypeus* rugosely punctured and separated by a curved carina from the strongly punctured forehead, which is bounded behind by a straight carina. The *pronotum* is rather sparingly and finely punctured behind and a little more strongly and closely in front. The front angles are rather sharp, the sides feebly sinuate in front and behind, and the base strongly rounded. The *elytra* are finely striate, the 7th stria is straight and parallel with the 6th, the intervals are flat and moderately finely and sparsely punctured. The *pygidium* is moderately punctured, the *metasternum* bears only a very few scattered punctures in the middle, and those of the sides are only a little more numerous.

Length, 6·5 mm.; breadth, 4 mm.

U. PROV.: Haldwani, Kumaon Div. (*H. G. Champion*).

A single male.

Type in the British Museum.

This closely resembles *O. mauritii*, but the elytra have a thin clothing of hairs and are less smooth and shining, the clypeus is distinctly bidentate, and the pygidium is less sparsely punctured. It is larger than *O. lilliputanus*.

215. **Onthophagus tritinctus.**

Onthophagus tritinctus Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 217.

Black and shining, with the head fiery red and the pronotum blue or green, the antennæ and mouth-organs yellow, the tarsi red, and the body clothed above and beneath with short yellowish setæ.

Broadly oval, compact and convex. The *head* is rather short and broad, fairly strongly dilated at the sides, with the clypeal margin rounded and very feebly excised in the middle. The *clypeus* is rugose and separated by a short transverse carina from the strongly but not closely punctured forehead, which bears between the eyes a pair of blunt tubercles nearly equidistant from each other and from the lateral margins. The *pronotum* is evenly, moderately strongly, and closely punctured. The front angles are sharp, the lateral margins straight in front and very feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the 7th stria straight and parallel with the 6th, the intervals are flat, fairly closely and not very finely punctured. The *pygidium* is fairly strongly and closely punctured. The metasternal shield bears scattered, not very fine, punctures, and those of the sides of the *metasternum* are rather finer and more numerous.

♂. The clypeus is shining and not closely rugose.

♀. The clypeus is closely rugose and not shining.

Length, 4 mm. ; breadth, 2·5 mm.

C. Prov. : Nagpur, 1000 ft. (*E. A. D'Abreu*). S. India : Coonoor (*F. H. Butcher*) ; Nandidrug (*T. V. Campbell*). Ceylon : Mt. Lavinia (*G. E. Bryant*, June) ; Peradeniya (*E. E. Green*, Nov.) ; Colombo (*G. M. Henry*, Oct.).

Type in M. Boucomont's collection.

The two sexes are almost alike in this little insect.

216. **Onthophagus trochilus**, sp. n.

Dark coppery, not very shining above, with the head and pronotum bright golden-red or golden-green, the upper surface rather closely clothed with fine pale setæ.

Oval and very convex. The *head* is moderately broad, fairly strongly and evenly punctured, with the *clypeus* short, rounded in front and separated by a feeble rounded carina from the forehead. There is a strong carina between the eyes. The *pronotum* is strongly, closely, and evenly punctured, the front angles are sharp, the lateral margins are straight in front and feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the 7th stria is straight and parallel with the 6th, and the intervals are flat, rather closely and not very finely punctured. The *pygidium* is strongly and closely punctured, the metasternal shield fairly evenly

but not strongly or closely, and the sides of the *metasternum* very sparsely. The front tibia is stout and armed with only three external teeth.

The type is a male.

Length, 5 mm. ; breadth, 3·5 mm.

TENASSERIM : Victoria Point (*W. Doherty*).

Type in the British Museum.

I have seen only a single specimen.

217. **Onthophagus lapillus**, sp. n.

Black and shining, with the head coppery, the pronotum deep metallic green or blue and the elytra black, with red humeral and outer apical patches and sometimes the sides broadly and indefinitely red. The antennæ, mouth-organs, and tarsi are rusty-red. The lower surface is sparsely clothed with short pale hairs.

Broadly oval, very compact and convex. The *head* is short and broad, strongly punctured, the *clypeus* coarsely and rugosely, its front margin rounded and very feebly sinuate in the middle. The clypeus bears a short curved carina, and there is a stronger straight carina between the eyes. The *pronotum* is rather evenly, not very finely, and moderately closely punctured, the front angles are not very sharp, the sides are almost straight in front and feebly sinuate behind, and the base is strongly rounded and not margined. The *elytra* are finely striate, the 7th stria straight and parallel with the 6th, the intervals flat and distinctly, not very sparsely, punctured. The *pygidium* is shining and fairly strongly punctured and the *metasternum* very finely and sparsely in the middle and more strongly at the sides.

The two sexes are alike.

Length, 4·5–5 mm. ; breadth, 3 mm.

SIKKIM : Pedong, 6000 ft. (*Major R. W. G. Hingston*, Mar.) ; Gopaldhara, Rungbong Valley (*H. Stevens*). PUNJAB : Dagshai, Simla Hills, 6000 ft. (*O. H. Walters*, July). U. PROV. : Dehra Dun (June, Aug.) ; Shamkhet, Kumaon (May) ; Mackinnon Park, Mussoorie (*C. F. C. Beeson*, Aug. ; *J. C. M. Gardner*, July).

Type in the British Museum.

Taken under bark at Dehra Dun by S. Bahadur in August.

218. **Onthophagus mauritii.**

Onthophagus mauritii Bouc.,* Ann. Soc. Ent. France, 1919 (1920), p. 311.

Black and very shining, usually with a faint metallic green or coppery lustre upon the posterior part of the head and the anterior part of the pronotum, and with the antennæ, mouth-organs, and a scanty clothing of setæ upon the lower surface, reddish-yellow.

Oval, convex, and rather deeply waisted, the elytra not very short. The *head* is short and broad, the clypeus closely rugosely punctured, with the anterior margin feebly sinuate, separated by a feebly curved carina from the forehead, which is fairly strongly punctured. There is a straight carina behind the eyes and the sides of the head are strongly rounded. The *pronotum* is evenly and fairly strongly punctured, the front angles are fairly sharp, the sides straight in front and feebly sinuate behind, and the base rounded. The *elytra* are sharply striate, the 7th stria straight and parallel with the 6th, and the intervals are slightly convex and punctured, not very minutely, at the sides. The *pygidium* is very smooth and shining, with rather sparse, moderately strong punctures. The metasternal shield and the sides of the *metasternum* are minutely and sparsely punctured.

I have found no external sexual difference.

Length, 6–7 mm. ; breadth, 4–4·5 mm.

BIHAR: Pusa (March). BOMBAY: Dharwar (*H. Swale*, Nov.). S. INDIA: Nilgiri Hills (*H. L. Andrewes*) ; Chikkaballapura (*T. V. Campbell*).

Type in M. Boucomont's collection.

219. **Onthophagus rana**, sp. n.

Black and shining, with the antennæ, mouth-organs and tarsi red, and the surface above and beneath very smooth and almost without hairs or setæ.

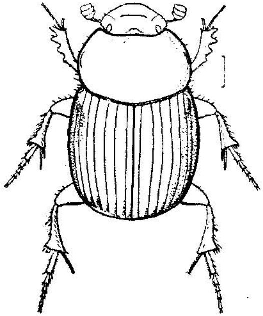

Fig. 31.—*Onthophagus rana*, ♂.

Rather elongate-oval, compact, and not very convex. The *head* is broad, finely, unevenly, and not closely punctured,

with the eyes not very small, the sides very strongly rounded, and the front margin straight in the middle. The *clypeus* is separated by a short straight carina from the forehead, and there is a blunt tubercle in the middle of the hind margin of the head. The *pronotum* is finely and not closely punctured, its front angles are rather blunt, the lateral margins are gently curved in front and nearly straight behind, and the base is rounded. The *elytra* are moderately long, fairly strongly striate, with rather faint punctures in the striæ, the 7th stria almost straight and parallel with the 6th, the intervals are very slightly convex and minutely and very sparsely punctured. The *pygidium* is very finely and sparsely punctured, the metasternal shield is very smooth, with a few very large punctures in front, and the sides of the *metasternum* are shallowly and not closely punctured.

♂. There is a slight declivity at the front of the pronotum.

♀. Unknown.

Length, 6 mm. ; breadth, 4 mm.

S. India : Kodaikanal (*T. V. Campbell*).

Type in the British Museum. The type is unique.

The elytra in this species are rather longer than usual.

Group 19.

This contains only *O. heterorrhinus* Lansb.

220. **Onthophagus heterorrhinus.**

Onthophagus heterorrhinus Lansb.,* Ann. Mus. Civ. Genova, xxii, 1885, p. 383.

Black, with the elytra bright orange-yellow, the suture and a broad irregular median band, divided externally into an anterior and posterior lobe, reaching the epipleuræ but not the outer margins, black, the head and pronotum suffused with a coppery or metallic green lustre. The antennæ and mouth-organs are yellow and the legs reddish. The body is clothed above and beneath with moderately long yellowish hairs, erect upon the upper surface and pygidium.

Minute, oval, highly convex, and very shining, the front tibia armed with three external teeth only. The *head* is rather narrow, shining, with large but scanty punctures, the ocular lobes strongly rounded, not angular, externally, the *clypeus* separated by a curved carina from the forehead. The *pronotum* is very convex, strongly and closely punctured. The front angles are sharply produced, the lateral margins nearly straight in front, gently sinuate behind, and the base strongly rounded. The *elytra* are very finely striate, the intervals flat and finely punctured in double series, the 7th stria not much

more strongly curved than the 6th. The *pygidium* is evenly and fairly strongly punctured, the metasternal shield strongly but not numerously, with a smooth unpunctured median line, and the sides of the *metasternum* bear large shallow punctures.

♂. The clypeus is produced and bluntly bilobed, with the sides almost straight, and the vertex bears a pair of minute tubercles between the eyes, about equally distant from the latter and from each other.

♀. The clypeus is gently rounded at the sides and truncate in front, and the vertex bears a short straight carina between the eyes.

Length, 4 mm. ; breadth, 2·5 mm.

BURMA : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.) ; Minhla (*Comotto*) ; Rangoon.

Type in the Genoa Museum.

Key to Group 20 (falcifer *group*).

1	(6)	*Pygidium not hairy nor setose.*	
2	(5)	Elytra very opaque ; body not very short.	
3	(4)	Pronotum not impressed nor tuberculate	*falcifer* Har., p. 270.
4	(3)	Pronotum impressed (♂) or tuberculate (♀)	*rubripennis* Arr., p. 271.
5	(2)	Elytra not very opaque ; body very short	*kumaonensis*, sp. n., [p. 272.
6	(1)	Pygidium hairy or setose.	
7	(8)	Clypeus not bilobed...............	*furcillifer* Bates, p. 273.
8	(7)	Clypeus more or less bilobed.	
9	(10)	Upper surface uniformly coloured ...	*circulifer*, sp. n., p. 274.
10	(9)	Shoulders of the elytra red-spotted.	
11	(12)	Elytral striæ replaced by large contiguous circles	*amicus* Gill., p. 275.
12	(11)	Elytral striæ bearing small non-contiguous circles	*furcicollis*, sp. n., p. 276.

221. **Onthophagus falcifer.**

Onthophagus falcifer Har., Deutsche Ent. Zeits. xxiv, 1880, p. 31.
Onthophagus cultrifer id., Berl. Ent. Zeits. xxx, 1886, p. 145 ; Gillet, Ann. Soc. Sci. Brux. xliv, 1925, p. 236.

Black, shining beneath and opaque above, but with shining ateral patches upon the pronotum of the male. The antennæ are dark and the upper surface is without hairs or setæ.

Oval and moderately convex. The *head* is rather broad, transversely rugose, except upon the posterior part, with the clypeal margin evenly rounded, except at the middle in the female, where it is straight, and the sides dilated and bluntly angular. The *pronotum* is densely covered with large, shallow and in parts confluent round pits, except upon the smooth ateral areas of the male. The front angles are very bluntly

produced, the sides are almost straight in front and feebly sinuate behind, and the base is rather sharply angulate in the middle. The *elytra* are rather deeply striate, the intervals flat and finely coriaceous, without visible punctures. The *pygidium* is coarsely rugose. The *metasternum* is finely and fairly closely punctured in the middle and more strongly and rather sparsely at the sides.

♂. The posterior margin of the head gives rise to a pair of strongly curved, divergent, and backwardly inclined horns, enclosing a nearly semicircular space, each horn having an angular dilatation internally at the base The pronotum is obliquely flattened, smooth and shining on each side anteriorly and steeply rounded in front.

♀. The posterior margin of the head forms a straight carina.

Length, 6–8 mm. ; breadth, 4–5 mm.

SIKKIM : Mangpu (*E. T. Atkinson*) ; Lopchu, 5000 ft. Darjeeling Dist. (*J. C. M. Gardner*, Sept.) ; Lachen, 9000–10,000 ft. (*R. W. G. Hingston*, April).

Types of *falcifer* and *cultrifer* probably in M. René Oberthür's collection.

Found in deer-dung.

222. **Onthophagus rubripennis.**

Onthophagus rubripennis Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 419.
Var. *subcribratus* id., l. c. p. 420.
Var. *vespillo* Bouc., Ann. Soc. Ent. France, lxxxviii, 1919, p. 314.

Black and shining beneath, opaque above, with a slight coppery lustre upon the head and pronotum, the elytra brick-red, and the antennæ, mouth-organs, and a rather scanty clothing of stiff hairs upon the lower surface yellow.

Oval and moderately convex. The *head* is rather coarsely rugose, not large, rounded and not angulate at the sides, with the clypeal margin rounded and very feebly emarginate in the middle. The *pronotum* is coarsely and rugosely punctured, with a slight depression at the middle of the base. The front angles are bluntly produced, the lateral margins nearly straight in front, feebly sinuate behind, and the base obtusely angulate in the middle. The *elytra* are deeply striate, with the intervals flat, opaque, and sparsely studded with extremely minute granules. The *pygidium* is opaque and rather rugosely punctured, the metasternal shield finely, and the sides of the *metasternum* more strongly but not very closely.

♂. The head is without carinæ, but there is usually a feebly elevated tubercle near the middle and a pair of horns rises from the posterior margin, nearly parallel at the base and inclined

obliquely backward, then abruptly and angularly diverging and curving outward, describing a semicircle when well developed. They are slender, but a little flattened. The pronotum has a rather deep, roughly punctured, roundish excavation in the middle of the anterior part, sometimes with a blunt tubercle on each side of its hinder margin.

♀. The clypeus is separated by a curved carina from the forehead, which is limited behind by a longer and more sharply elevated carina. The pronotum bears a slight double prominence just behind the front margin.

Var. *subcribratus*.—The sculpture of the pronotum is denser and more rugose.

Var. *vespillo*.—The entire body is black.

Length, 9–12 mm. ; breadth, 5·5–7 mm.

BHUTAN. SIKKIM : Phadam Chen, 7000 ft. (*R. W. G. Hingston*, Mar.) ; Kurseong (*Bretandeau*). ASSAM : Dumpep, Khasi Hills, 6000 ft. (*T. Bainbrigge Fletcher*, Oct.) ; Shillong (*F. W. Champion, C. F. C. Beeson*, May). BURMA : Kanpetlet, Pakokku Hill Tracts, 6500 ft. (*B. Fischer*, June) ; N. Chin Hills.

Type in the British Museum.

223. **Onthophagus kumaonensis**, sp. n.

Black, not very shining, with the tibiæ and tarsi, the antennal foot-stalk and the mouth-organs red, and the upper surface clothed only with extremely minute and inconspicuous setæ.

Broadly oval, compact, and moderately convex. The *head* is short and broad, strongly and closely punctured, angulate at the sides, with the *clypeus* very short, broadly excised in front, and separated by a long curved carina from the broad forehead, which bears close annular punctures and is limited by a short carina behind. The *pronotum* bears large and close umbilicate punctures, those near the base larger than the rest. The front angles are very bluntly rounded, the sides nearly straight in front, feebly curved behind, the hind angles obsolete, and the base strongly rounded. The *elytra* are finely striate, the 7th stria strongly rounded, the intervals nearly flat, minutely granulate, and having on each side a row of close, large, annular punctures contiguous with the striæ. The *pygidium* bears large, close, annular punctures. The front angles of the prothorax are a little hollowed beneath, the metasternal shield bears large scattered punctures and the sides of the *metasternum* large and rather close annular punctures. The abdominal sternites have each a row of large umbilicate punctures.

The two sexes are nearly alike.

Length, 4·5 mm. ; breadth, 2·5 mm.

U. Prov.: Naini Tal (*H. G. Champion*); W. Almora (*H. G. Champion*, Aug.); Mussoorie, 6000–7000 ft. (*J. C. M. Gardner*, June; *Col. Harcourt*, July, Sept.). Punjab: Theog, Simla Hills, 7600 ft. (*S. N. Chatterjee*, Sept.).

Type in the British Museum.

This has a rather close resemblance to *O. amicus* Gill., especially in the peculiar sculpture of the elytra, but it differs in the very blunt front angles of the prothorax and the curved 7th stria of the elytra.

224. **Onthophagus furcillifer.**

Onthophagus furcillifer Bates, Entom. xxiv, 1891, Suppl. p. 11.

Black, not very shining, with the head and pronotum, or at least the front and sides of the latter, obscurely coppery, the antennæ and mouth-organs yellow, and the body clothed above and beneath with pale setæ, those of the upper surface extremely minute.

Oval and very convex. The *head* is short but not very broad, the ocular lobes are strongly rounded, the *clypeus* rounded but very feebly emarginate in the middle, and separated by a strongly rounded carina from the sparingly punctured forehead. The *pronotum* is closely covered with large annular punctures, the centre of each forming an elevated granule. The front margin is vertical and rather smooth in the middle, and at its upper edge there are four nearly equidistant tubercles, the two inner ones more or less united together. The front angles are blunt, the lateral margins gently rounded in front and sinuate behind, the base very obtusely angulate in the middle. The *elytra* are fairly strongly striate, the dorsal intervals flat and bearing minute scattered granules. The *pygidium* bears close shallow punctures, the metasternal shield is strongly but sparingly punctured, and the sides of the *metasternum* are less strongly but more closely punctured.

♂. The clypeus is shining and bears a few large deep punctures, and between the eyes rises a vertical lamina which dilates and bifurcates slightly at its summit. The vertical front margin of the pronotum is broad and the four marginal tubercles are large and project freely.

♂ (minor). The head is armed only with a transverse erect ridge, not divided above.

♀. The clypeus is rugose, and there is a straight posterior carina between the eyes. The vertical front margin of the pronotum is narrow, the two inner tubercles are united and the two outer ones feeble.

Length, 5·5–6 mm.; breadth, 3·5 mm.

Assam: Haflong, Cachar Dist. (*C. F. C. Beeson*, May); Shillong, 5000 ft. (*L. B. Parker*, Nov.). Kashmir: Banihal,

9000 ft. (*B. M. Bhatia*, May); Ramban, Udhampur, 2600 ft. (*B. M. Bhatia*, May). PUNJAB: Kulu (*Capt. Young*); Murree, 5500 ft. (*B. M. Bhatia*, June). U. PROV.: W. Almora, Kumaon (*H. G. Champion*); Mussoorie (*C. F. C. Beeson*, Sept.); Timli, Siwalik Hills (*M. Cameron*, Nov.); Ringal Gad (*M. Cameron*, April); Dehra Dun (*C. F. C. Beeson*, April). C. PROV.: Ama Nala, Bilaspur, 1400 ft. (*C. F. C. Beeson*, Nov.). S. INDIA: Kharkur Ghat, Malabar.

Type in M. René Oberthür's collection.

Found in cattle-dung.

This species is closely similar to *O. negligens* Walk., but differs in the peculiar annular punctures of the pronotum.

225. **Onthophagus circulifer**, sp. n.

Dull black, with the head, the anterior margin of the pronotum, and the lower surface dark coppery and shining, the antennæ and mouth-organs yellow, and clothed above with minute erect grey setæ.

Oval, very compact and convex. The *head* is fairly broad, coarsely and sparingly punctured, with the ocular lobes strongly rounded externally. The *pronotum* is very convex and evenly and closely punctured, with large annular punctures, except at the front margin, which is vertical, smooth, and shining, its upper edge usually bearing four very feeble prominences, the two middle ones sometimes fused together. The front angles are blunt, the lateral margins nearly straight in front, gently sinuate behind, and the base strongly rounded. The *elytra* are shallowly striate, the intervals flat, with minute and not very numerous granules. The *pygidium* bears large annular punctures. The metasternal shield bears large scattered punctures and a median groove, and the sides of the *metasternum* are similarly but a little more closely punctured.

♂. The clypeus is slightly produced and bilobed in front, and the posterior part of the head is produced into a pair of short parallel horns inclined backwards, not far apart and united at the base by a carina which bears a sharp tooth in the middle.

♀. The clypeus is very short, rounded and entire in front, divided from the forehead by a short strongly curved carina, and there is a straight posterior carina between the eyes.

Length, 5·5–6 mm.; breadth, 3–3·5 mm.

SIKKIM: Pedong, 6000 ft. (*R. W. G. Hingston*, Mar.). ASSAM: Shillong (*C. F. C. Beeson*, May). U. PROV.: Jhajra Range, Dehra Dun (*C. F. C. Beeson*, Nov.).; Mohand Rau, Siwalik Hills (*M. Cameron*, Sept.). KASHMIR: Ramban, 2600 ft., Chenab Valley, Jammu Prov. (*C. F. C. Beeson*,

May). C. Prov.: Khinsi Hills, Nagpur, 1500 ft. (*E. A. D'Abreu*, Sept.). Bengal: Singla, 1500 ft. (June), and Soom, 4000–5000 ft. (July), Darjiling Dist. (*Lord Carmichael's collector*). Burma: Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May).

Type in the British Museum.

In form and sculpture this agrees almost exactly with *O. furcillifer* Bates, except that the granules upon the elytra are rather finer. The doubly-horned head of the male and the excised clypeus in both sexes distinguish it.

226. **Onthophagus amicus.**

Caccobius amicus Gill.,* Ann. Soc. Sci. Brux. xliv, 1925, p. 230.

Black and moderately shining, with the head coppery and the front of the pronotum sometimes slightly metallic, each elytron with a red spot upon the shoulder and another at the outer part of the posterior margin, the antennal foot-stalk, tarsi, and mouth-organs red, and the upper surface, except the head, fairly thinly clothed with short, stiff, grey setæ.

Broadly oval, compact and convex. The *head* is smooth and shining, not very broad, with a few scattered punctures, the sides strongly rounded and the *clypeus* bilobed. The *pronotum* bears large, close, umbilicate punctures. The front angles are sharply produced, the sides feebly bisinuate in front and nearly straight behind, and the base is strongly rounded. The elytral striæ consist of chains of large, contiguous, annular punctures, and the intervals are flat and bear conspicuous but not very numerous or regular granules. The *pygidium* bears large not very numerous punctures. The metasternal shield bears a few large scattered punctures, and the sides of the *metasternum* have fairly close annular punctures. The front angles of the pronotum are a little hollowed beneath.

♂. The lobes of the clypeus are bluntly rounded and the head bears between the eyes an erect quadrate lamina gently emarginate at its upper edge. The front margin of the pronotum is nearly vertical in the middle.

♀. The clypeus is sharply notched in front and the two lobes are acute. It is separated from the forehead by a rounded carina, and there is a straight carina between the eyes. The pronotum has a slight double prominence immediately behind the front margin.

Length, 4–4·5 mm.; breadth, 2·5 mm.

U. Prov.: Haldwani Dist., W. Almora, Kumaon (*H. G. Champion*); Dhauli Ganga Valley, 9520 ft., Almora (*R. N. Parker*, July); Nun Nadi, Dehra Dun (*M. Cameron*, July). Sikkim: Gopaldhara, Rungbong Valley, 3500–4700 ft.

(*H. Stevens*, Sept.). ASSAM: Naga Hills, 3000 ft. (*S. N. Chatterjee*, April).

Type in Dr. Gillet's collection.

Found in carrion by Dr. M. Cameron.

227. **Onthophagus furcicollis**, sp. n.

Black, not very shining, except upon the head, which is *slightly metallic*, the elytra with a red spot upon each shoulder and another near the outer part of the hind margin.

Broadly oval, compact and very convex. The *head* bears

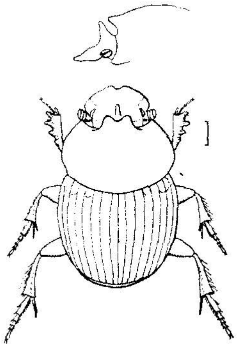

Fig. 32.—*Onthophagus furcicollis*, ♂, and lateral view of head and thorax.

only a few fine scattered punctures. It is not very broad, the sides are rounded, and the *clypeus* is bluntly bilobed. The *pronotum* bears large, close, umbilicate punctures. The front angles are sharply produced, the sides nearly straight in front and behind, and the base is strongly rounded. The *elytra* bear chains of large annular punctures in the place of the striæ, and the intervals are asperately punctured. The *pygidium* bears very large annular punctures. The metasternal shield bears only a few scattered punctures, and the sides of the *metasternum* large annular punctures fairly close together.

♂. The head bears a short, straight, erect horn between

the eyes, and the pronotum has a broad bifurcate horizontal process projecting over the posterior part of the head.

The female is unknown.

Length, 4 mm.; breadth, 2·5 mm.

SIKKIM: Gopaldhara, Rungbong Valley, 4000 ft. (*H. Stevens*, Sept.). U. PROV.: Nun Nadi, Dehra Dun (*M. Cameron*, July).

Type in the British Museum.

Found in carrion by Dr. M. Cameron.

This species has a deceptive resemblance to *O. amicus* Gill., the size, shape, coloration and sculpture being almost the same. It may be distinguished by the chains of large annular punctures which replace the elytral striæ. The type-specimen from Gopaldhara has a very prominent thoracic process, but the Dehra Dun specimen, which is a very little smaller, has only two slight tubercles to represent this. Both are males.

Key to Group 21 (gagates *group*).

Elytra shining; front angles of the prothorax not hooked	*gagates* Hope, p. 277.
Elytra opaque; front angles of the prothorax a little hooked	*hingstoni*, sp. n., p. 278.

228. **Onthophagus gagates.** (Plate XII, figs. 13, 14.)

Onthophagus gagates Hope,* Gray's Zool. Misc. 1831, p. 22.
Onthophagus angulatus Redt.,* Hügel's Kaschmir, iv, 2. 1848, p. 522, pl. 24, fig. 6.

Entirely black, very smooth and shining, but with the sides of the pronotum dull and slightly iridescent, and a row of three small red spots at each lateral margin of the abdomen beneath.

Oval and rather convex. The *clypeus* is produced, rugose, and the forehead and vertex are closely punctured. There is a fine curved anterior carina and a similar posterior one. The *pronotum* is very finely and sparsely punctured dorsally, more strongly and closely at the sides, which are sloping, with a dorsal projection outward on each side. It is entirely margined, the front angles are sharp and the base gently rounded and scarcely angulate in the middle, where there is a very slight depression. The *elytra* are deeply striate, the striæ feebly punctured, and the intervals finely and rather sparingly punctured. The *pygidium* is rather strongly punctured at the apex and less strongly at the base. The meso-metasternal suture is angulate, the *metasternum* a little depressed in front and rather strongly punctured at the sides.

♂. The clypeus is rugosely punctured, produced into a rather sharp point, and strongly recurved. The front and sides of the pronotum slope abruptly, leaving the posterior part triangularly elevated, the base of the triangle strongly produced

on each side, and its sides obtusely angulate in the middle. The front tibia is slender, except at the extremity, where it is dilated, with the 2nd tooth rather large and triangular the 1st and 3rd small, and the 4th minute.

♀. The clypeus is transversely rugulose, its front margin rounded and scarcely reflexed. The pronotum is convex and has only a slight tubercle on each side.

Length, 11–14·5 mm. ; breadth, 6·5–8·5 mm.

ASSAM : Shillong, 5500 ft. (*T. Bainbrigge Fletcher*, Aug.–Oct.) ; Manipur (*W. Doherty*) ; Haflong, Cachar Dist. (*C. F. C. Beeson*, May). NEPAL (*Maj.-Gen. Hardwicke*). U. PROV. : Ranikhet, W. Almora (*H. G. Champion*) ; Muktesar, Kumaon, 7500 ft. (*T. Bainbrigge Fletcher*, Sept.) ; Chakrata (*S. K. Pillai*, June) ; Mussoorie, 6000–7000 ft. (*Col. Harcourt*, July). PUNJAB : Simla (*E. C. Ansorge*) ; Matiana, Simla Hills, 7900 ft. (*S. N. Chatterjee*, Sept.).

Type in the British Museum ; that of *angulatus* in the Vienna Museum.

229. **Onthophagus hingstoni**, sp. n.

Entirely black, including the antennæ, smooth and shining beneath and opaque above, except upon the head and the middle of the pronotum, without clothing above and very scantily clothed with hair beneath.

Oval, compact and moderately convex. The *head* is broad, strongly and irregularly punctured, without carinæ, with the sides strongly rounded behind and convergent in front. The *pronotum* is fairly strongly punctured in the middle and very minutely and scantily at the sides and in the middle of the base, where it is opaque. The front angles are a little produced outward, not acute, the sides nearly straight in front, feebly sinuate behind, and the base rounded. The *elytra* are very finely striate, with the intervals flat, opaque, and very minutely and sparsely asperately punctured. The *pygidium* is opaque, except at the apex, and finely and sparingly punctured. The metasternal shield is finely and sparingly punctured, with a median groove, and the sides of the *metasternum* are strongly but not closely punctured.

♂. The clypeus is produced to a blunt point and strongly reflexed in front. The pronotum slopes abruptly on each side and in front, and the posterior dorsal part is bluntly angular in front and acutely angular on each side. The front tibia is elongate, with its two terminal teeth close together and the apical one directed forward.

♀. The clypeus is closely and rugosely punctured and its front margin is lightly excised in the middle.

Length, 8–10·5 mm. ; breadth, 5–5·5 mm.

SIKKIM: Tsuntang, 7000 ft., Lachen, 8000–10,000 ft (*R. W. G. Hingston*, April).

Type in the British Museum.

Key to Group 22 (dama *group*).

1	(52)	Upper surface entirely dark (sometimes with a variable metallic lustre).	
2	(17)	Pronotum finely and rather sparsely punctured.	
3	(12)	Elytral suture without a minute elevation behind the base; front tibia of ♂ with the terminal tooth oblique.	
4	(9)	Upper surface shining.	
5	(8)	Metallic green, blue or coppery.	
6	(7)	Larger; elytra not very glossy	*dama* F., p. 280.
7	(6)	Smaller; elytra very glossy	*refulgens*, sp. n., p. 281.
8	(5)	Black	*quadridentatus* F., p. 282.
9	(4)	Upper surface dull.	
10	(11)	Front angles of the thorax bluntly produced	*concolor*, Sharp, p. 283.
11	(10)	Front angles of the thorax not produced	*lævigatus*, F., p. 284.
12	(3)	Elytral suture with a minute elevation near the base; front tibia of ♂ with the terminal tooth at a right angle.	
13	(16)	Upper surface shining.	
14	(15)	Clypeo-frontal carina feebly curved ..	*pardalis* F., p. 285.
15	(14)	Clypeo-frontal carina strongly curved.	*bengalensis* Har., p. 286.
16	(13)	Upper surface dull	*paliceps*, sp. n., p. 287.
17	(2)	Pronotum well, not sparsely, punctured.	
18	(37)	Elytra lightly, not deeply, striate.	
19	(20)	Front angles of the thorax strongly produced	*nasalis*, sp. n., p. 288.
20	(19)	Front angles of the thorax not strongly produced.	
21	(24)	Elytral suture with a minute elevation near the base.	
22	(23)	Pronotum black	*hindu*, sp. n., p. 289.
23	(22)	Pronotum coppery.................	*ephippioderus*, Arr., p. 290.
24	(21)	Elytral suture without a minute elevation near the base.	
25	(30)	Pronotum closely and uniformly punctured.	
26	(27)	Elytra dull	*mirandus*, sp. n., p. 290.
27	(26)	Elytra shining.	
28	(29)	Eyes (as seen from above) very small.	*kuluensis* Bates, p. 292.
29	(28)	Eyes (as seen from above) larger	*armatus* Bl., p. 293.
30	(25)	Pronotum unequally and unevenly punctured.	
31	(34)	Elytral intervals sparsely granulate.	
32	(33)	Entirely black	*semicinctus* d'Orb., p. 294.
33	(32)	Metallic, with the pygidium red	*ruficauda*, sp. n., p. 295
34	(31)	Elytral intervals punctured.	
35	(36)	Elytral intervals closely, not very finely, punctured	*denticornis* Bouc., p. 295.

36	(35)	**Elytral intervals very finely and sparingly punctured**	***agnus*** **Gill., p. 296.**
37	(18)	Elytra deeply striate.	
38	(41)	Pronotum not closely punctured.	
39	(40)	Very convex	*urellus* Bouc., p. 297.
40	(39)	Not very convex	*tragoides* Bouc., p. 298.
41	(38)	Pronotum rather closely punctured.	
42	(45)	Elytra very shining.	[p. 299.
43	(44)	Entirely black	*taprobanus*, sp. n.,
44	(43)	Head and pronotum metallic........	*coracinus* Bouc., p. 300.
45	(42)	Elytra not very shining.	
46	(47)	Eyes (seen from above) very narrow..	*fossor*, sp. n., p. 300.
47	(46)	Eyes (seen from above) not very narrow.	
48	(51)	Very convex ; pronotum very closely punctured.	
49	(50)	Very short ; metallic..............	*triceratops* Arr., p. 301.
50	(49)	Not very short ; black	*bison*, Bouc., p. 302.
51	(48)	Not very convex ; pronotum not very closely punctured	*tragus* F., p. 303.
52	(1)	Upper surface not entirely dark.	
53	(60)	Not minute.	
54	(59)	Pygidium yellow.	
55	(56)	Elytra mottled	*sagittarius* F., p. 304.
56	(55)	Elytra yellow, with black stripes	
57	(58)	Not horned ; elytral intervals with scattered punctures	*difficilis* Walk., p. 306.
58	(57)	Head with two horns (♂) or short processes (♀) ; elytral intervals with scattered granules	[p. 307. *transcaspicus* Koenig,
59	(54)	Pygidium dark	*marginalis* Gebl.,p. 247.
60	(53)	Minute.	
61	(62)	Elytra dark.......................	*hamaticeps*, sp. n.,
62	(61)	Elytra yellow.	[p. 308.
63	(64)	Elytral striæ very finely punctured...	*politus* F., p. 309.
64	(63)	Elytral striæ strongly punctured	*bicolor* Rafir., p. 310.

A few punctures upon the anterior part of the pronotum of *O. marginalis* generally coalesce, and that species is therefore included also in Group 13.

230. Onthophagus dama.

Copris dama F.,* Ent. Syst. Suppl. 1798, p. 32.
Onthophagus dama d'Orb., L'Abeille, xxix, 1898, p. 217.

Dark greenish- or bluish-black or coppery, with the lower surface, head, and pronotum shining, and the elytra not very shining.

Oval, compact, not very convex, entirely without hair or setæ above. The *clypeus* is semicircularly rounded, with the margin a little more strongly raised in the middle than at the sides. The *pronotum* is finely and sparsely punctured, with the front angles blunt, the sides nearly straight, and the base gently rounded. The *elytra* bear distinctly punctured striæ, with the intervals almost flat and extremely finely and sparsely

punctured, except at the sides, where the punctures are rather larger and more numerous. The *pygidium* is opaque and moderately punctured, the front and sides of the *metasternum* are strongly punctured.

♂. The clypeus is feebly punctured, bordered behind by a feeble carina or with none, and the vertex bears a pair of horns, arising close to the eyes, inclined slightly backward, curving outward, and approaching one another at the tips, each having an external tooth beyond the middle. The horns are often very short, without tooth and not curved, and sometimes they are merely slight prominences.

♀. The clypeus is strongly transversely rugose, separated from the forehead by a strong curved carina, and sometimes with another parallel carina close to and in front of the last. Upon the middle of the vertex there is an erect, flattened, and truncate tubercle. The pronotum is a little more strongly punctured in front than that of the male, and bears two slight tubercles just behind the front margin, not very close together.

Length, 8·5–11 mm. ; breadth, 5–7 mm.

NEPAL (*Maj.-Gen. Hardwicke*). BHUTAN. SIKKIM : Gopaldhara, Rungbong Valley (*H. Stevens*). BENGAL : Singla, 1500 ft. Darjeeling Dist. (June) ; Calcutta. BIHAR : Pusa (*D. Nowrojee*, Mar., April, June, Sept.). U. PROV. : W. Almora, Kumaon (*H. G. Champion*, Aug.) ; Jhajra Range, Dehra Dun (*C. F. C. Beeson*, Nov.). C. PROV. : Nagpur, 1000 ft. (*E. A. D'Abreu*, June, Aug., Sept.) ; Supkhar, Balaghat District, 2629 ft. (*E. A. D'Abreu*, Jan.). BOMBAY : Poona ; Belgaum (*H. E. Andrewes*). S. INDIA : Kanara (*T. R. D. Bell*) ; Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May) ; Nilgiri Hills (*H. L. Andrewes*) ; Bangalore (*C. F. C. Beeson*, Aug.) ; Nilambur (*C. F. C. Beeson*, Aug.). CEYLON : Peradeniya (*E. E. Green*, Mar., Oct.) ; Dikoya, 4000 ft. (*G. Lewis*, Jan.) ; Madugoda (*G. M. Henry*, April) ; Colombo (*G. M. Henry*, Aug.) ; Bettaramulla (*G. M. Henry*, Mar.).

Type in the Copenhagen Museum.

Scarabæus æneus Oliv. has been incorrectly regarded as belonging to this species.

231. **Onthophagus refulgens**, sp. n.

Shining black, with a slight coppery lustre upon the head, pronotum, and lower surface, and the tarsi, antennæ, and mouth-organs reddish. The body is very smooth and devoid of hairs or setæ above.

Oval and moderately convex. The *head* is fairly broad, the eyes not very small as seen from above, the sides of the head rounded in front of the eyes, the *clypeus* divided by a curved carina from the finely and sparsely punctured forehead, and the

vertex bearing a short transverse elevation in the middle. The *pronotum* is very finely and not at all closely punctured. The front angles are not very sharp, the sides are nearly straight in front and feebly sinuate behind, and the base is gently rounded. The pronotum is slightly hollowed at the front margin. The *elytra* are finely striate, the striæ lightly and not very numerously punctured, the 7th stria nearly straight and parallel with the 6th, the intervals very feebly convex and scantily and extremely minutely punctured. The *pygidium* is very smooth and shining, with very minute and scanty punctures. The metasternal shield bears large round pits anteriorly and is very smooth and shining behind, and the sides of the *metasternum* also are coarsely pitted.

♂. The clypeus is very smooth and shining, with its front margin reflexed and feebly excised in the middle. The pygidium has a deeply incised line near the outer margin.

♀. The clypeus is a little longer than that of the male, and is divided transversely by a long, nearly straight carina. The anterior part is rather coarsely rugose and the posterior part smooth. The clypeal margin is not excised. The pygidium is without a marginal line, except at the base on each side.

Length, 4·5–6·5 mm.; breadth, 3–4·5 mm.

CEYLON: Nuwara Eliya, 6000–8000 ft. (*G. Lewis*, Feb., *G. M. Henry*, July, Dec.); Ohiya (*G. M. Henry*, April). S. INDIA: Kodaikanal, Madura Dist. (*T. V. Campbell*); Shembaganur (*P. du Breuil*).

The examples from S. India are on the whole a little larger than those from Ceylon, and in the males the clypeus is rather strongly punctured in front. The additional carina upon the clypeus of the female in this species is a distinctive feature.

232. Onthophagus quadridentatus.

Copris quadridentatus F.,* Ent. Syst. Suppl. 1798, p. 34.
Copris quadricornis F.,* Syst. Eleuth. i, 1801, p. 54.
Onthophagus quadridentatus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 229.
Onthophagus mœrens Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 209.

Black, smooth and shining, with the elytra a little less shining, the antennæ and mouth-organs yellow, and the tarsi reddish. The upper surface is without hairs or setæ, and the lower surface bears only very scanty yellow hairs.

Broadly oval and moderately convex. The *head* is broad, the eyes are not very small seen from above, the ocular lobes are strongly rounded in front of the eyes, and the clypeal margin is evenly rounded and strongly reflexed. The *pronotum* is finely and not closely punctured. The front angles are not

very sharp, the lateral margins are nearly straight in front, feebly sinuate behind, and the base is gently rounded and finely margined. The *elytra* are strongly striate, the striæ closely but not strongly punctured, and the intervals slightly convex and extremely sparsely and minutely punctured. The *pygidium* is opaque and finely and sparingly punctured. The metasternal shield is finely and sparingly punctured, and the sides of the *metasternum* a little more strongly.

♂. The head is very smooth and shining, with very fine and sparse punctures, the clypeus separated from the forehead by a slight rounded carina, and the hind margin of the head is produced backward, forming a pair of short horns curving upward and outward and slightly approximating at the tips. Within and near the base of each horn is a short upward-directed spine-like tooth. The anterior part of the pronotum is a little flattened on each side of the middle.

♀. The clypeus is transversely rugose and separated by a strong, nearly straight carina from the strongly punctured forehead, and there is another carina upon the vertex. The pronotum is usually rather more strongly punctured than that of the male.

Length, 6–8 mm. ; breadth, 4–5 mm.

ASSAM : Patkai Hills (*W. Doherty*). BENGAL : Calcutta (*R. G. Pillai*, Mar.) ; Berhampore (*E. T. Atkinson*). C. PROV. : Nagpur, 1000 ft. (*E. A. D'Abreu*). C. INDIA : Jaithari Range, Umaria, Rewah State (*C. F. C. Beeson*, Nov.). BOMBAY : Belgaum (*H. E. Andrewes*) ; Poona (*P. Grose*). S. INDIA : Bangalore (*C. F. C. Beeson*, Aug.) ; Coimbatore (Jan., April, May, Sept.) ; Palni Hills, 3000–6000 ft. (*P. S. Nathan*, May) ; Nilgiri Hills ; Mahé, Malabar (*M. Maindron*, July) ; Sappal, Palghat, 1700 ft. (*J. C. M. Gardner*, May). CEYLON : Colombo (*G. M. Henry*, Sept.) ; Vavuniya (*G. M. Henry*, April) ; Hanwella (*G. M. Henry*, May) ; Murunkan, N. Prov. (*G. M. Henry*, July) ; Hambantota (*G. M. Henry*, Aug.).

Types of Fabricius in the Copenhagen Museum ; that of *mœrens* Walker in the British Museum.

233. **Onthophagus concolor.**

Onthophagus concolor Sharp, Journ. Asiat. Soc. Bengal, xlvii, 2, 1878, p. 170.

Black, shining beneath and opaque above, with the mouth-organs, the foot-stalk of the antennæ and the tarsi dark red, and bearing an extremely inconspicuous clothing of minute setæ above. The antennal club is dark.

Broadly oval, compact, and not very convex. The *head* is moderately broad, rounded, and not angular at the sides behind, with the *clypeus* feebly excised in front and gently

rounded at the sides. The posterior margin bears a slightly elevated carina. The *pronotum* is finely and sparsely punctured; its front angles are a little produced but not very sharp, the lateral margins are nearly straight in front, gently curved behind, and continuous with the rounded base. The *elytra* are finely striate, with the intervals flat and minutely and sparsely asperately punctured. The *pygidium* also is minutely and sparsely punctured. The metasternal shield bears scattered punctures, and the sides of the *metasternum* are minutely and rather sparsely punctured.

♂. The clypeus and forehead are not distinctly separated, but the clypeus is more shining, closely and irregularly punctured. The posterior margin of the head is produced backward in the middle, forming a short upward-curving horn, sometimes absent.

♀. The clypeus is divided from the forehead by a rounded carina and transversely rugose but rather shining. The posterior margin of the head is sometimes produced a little upward in the middle as a short rectangular lamina.

Length, 7·5–10 mm.; breadth, 5–6 mm.

U. PROV.: Konain, Chakrata, 7800 ft. (*M. Cameron*, May); Bodyar, Chakrata, 8000 ft. (*C. F. C. Beeson*, June); Deoban, Chakrata, 9331 ft. (*M. Cameron*, May). PUNJAB: Camp Thobba, Murree Hills (*Howland Roberts*); Kangra Valley; Simla (*E. C. Ansorge*); Simla Hills, Kotgarh, 7000 ft. (*S. M. Chatterjee*, Sept.). KASHMIR: Batote, Udhampur Div., 5500 ft. (*C. F. C. Beeson*, May): Ferozepur Nullah, Gogaldara, Gulmarg, 7000 ft. (*C. F. C. Beeson*, June); Killanmarg, Gulmarg, 11,000 ft.: Harwan, Pohru Valley, 6000 ft. (*C. F. C. Beeson*, May): Afan, 5500 ft., Dardpur, 6500 ft., Putshai, 6000 ft., and Nagmarg, 10,500 ft., Lolab Valley (*C. F. C. Beeson*, May); Hutmara, 6000 ft., Pahlgam, 7000 ft., Frislina, Aru, 8000 ft., and Liderwat, 9000 ft., Lidar Valley (*C. F. C. Beeson*, June).

Type in M. René Oberthür's collection.

234. Onthophagus lævigatus.

Copris lævigatus F.,* Ent. Syst. Suppl. 1798, p. 35.
Onthophagus lævigatus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 237.

Black and opaque, with the head, the anterior part of the pronotum, and the lower surface shining, the antennæ and mouth-organs red and clothed only with very scanty reddish setæ upon the lower surface and legs.

Oval and not very convex. The *head* is broad and short, the eyes not very small as seen from above, the ocular lobes well dilated in front of the eyes but rounded and not angulate,

the *clypeus* with a broadly rounded margin, straight or feebly excised in the middle, and not separated from the forehead. The *pronotum* is unevenly punctured, very finely and sparsely in the middle, and rather more coarsely at the sides. The lateral margins are gently rounded in front, the front angles blunt and not at all produced, feebly sinuate behind, and the base rounded. The *elytra* are finely striate, with the intervals flat and minutely and irregularly granular. The *pygidium* is opaque and bears only a few minute punctures. The metasternal shield is strongly punctured at the sides, and the sides of the *metasternum* are less strongly but rather more closely punctured.

♂. The clypeus is shining and rather finely rugosely punctured, and the forehead almost smooth but not very shining.

♀. The clypeus is closely transversely rugose, and the forehead unevenly punctured.

Length, 6–9 mm. ; breadth, 4–5 mm.

S. INDIA : Chikkaballapura, Madura Dist. (*T. V. Campbell*) : Buravalli, Bellary Dist., Aug.) ; Parur, S. Arcot (Feb.) ; Coimbatore (Feb.) ; Madras City (*M. O. T. Iyengar*) ; C. Comorin, Travancore (*J. Castets*). CEYLON : Colombo (*G. M. Henry*, Dec.).

Type in the Copenhagen Museum.

235. **Onthophagus pardalis.**

Copris pardalis F., Ent. Syst. Suppl. 1798, p. 29.
Onthophagus pardalis Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 221.

Shining black, with the elytra and pygidium subopaque, the antennæ and mouth-organs bright yellow, and the lower surface extremely sparsely clothed with pale setæ.

Broadly oval and not very convex. The *head* is broad, nearly semicircular in front, with the clypeal margin strongly reflexed, and the ocular lobes strongly dilated but rounded and not angulate. The vertex bears a short erect horn, broad at the base. The *pronotum* is finely and rather sparingly punctured. The front angles are blunt, the lateral margins nearly straight in front, gently sinuate behind, and the base gently and uniformly rounded. The *elytra* are finely striate, the striæ lightly punctured, the intervals almost flat and minutely and sparsely punctured. There is a slight tubercular elevation upon the suture just behind the base. The *pygidium* is sparsely and very minutely punctured. The metasternal shield is almost unpunctured, and the sides of the *metasternum* not very strongly or closely.

♂. The clypeus is shining, rather closely, almost rugosely, punctured, separated by a slightly curved carina from the very

lightly punctured forehead. The pronotum is nearly vertica in front and has a slight broad prominence in the middl of the front margin of the declivity. The teeth of the fron tibia are set at a right angle to its inner edge and the spu forms a very short broad plate.

♀. The clypeus is closely transversely rugose, and separate by two parallel carinæ from the rather strongly puncture forehead. The horn is very short and conical. The teeth o the front tibia are long and oblique and the spur is slende and curved.

Length, 8–9 mm. ; breadth, 5–5·5 mm.

BOMBAY : Belgaum (*H. E. Andrewes*). S. INDIA : Kanara (*T. R. D. Bell*) : Nilgiri Hills (*G. F. Hampson*) ; Trichinopoly (*R. O. Jermyn*, Nov.).

The type of Fabricius, originally in the Copenhagen Museum, has disappeared, and the identification is therefore a little uncertain, but the description appears on the whole to apply best to this species.

236. **Onthophagus bengalensis.**

Onthophagus bengalensis Har., Berl. Ent. Zeits. xxx, 1886, p. 146.

Black and opaque, with the head, legs, and lower surface shining, the antennæ and mouth-organs yellow. The upper surface is entirely, and the lower surface almost, devoid of hairs or setæ.

Oval, compact, and convex. The *head* is rather short and broad, with moderately large eyes, the sides bluntly angulate before the eyes, the clypeal margin rounded and very feebly excised in the middle. The *pronotum* is finely and sparsely punctured. The front angles are a little produced but not very sharp, the sides nearly straight in front and feebly sinuate behind, and the base very gently rounded. The *elytra* are lightly striate, the striæ finely punctured, the intervals flat, the dorsal intervals extremely sparsely and minutely punctured, the outer ones rather more strongly and numerously. There is a slight tubercular elevation upon the suture just behind the base. The *pygidium* is opaque and very finely and sparsely punctured. The metasternal shield bears a very few fine scattered punctures and the sides are rather more strongly and closely punctured.

♂. The clypeus is shining, finely but not very closely punctured, separated by a very strongly rounded carina from the very smooth and shining forehead. From the inner margin of the eye on each side, and continuous with the two ends of the carina, arise a pair of short slender horns curving inward and inclined slightly backward, and midway between them is a slight double tubercle. The pronotum is almost

vertical in the middle, but not abruptly, and there is a very slight, smooth, shining hollow on each side of the middle. The front tibia is short and broad, with the exterior teeth sharp and set at a right angle to the inner edge, the apical edge straight and the terminal spur short, broad, and truncate.

♀. Unknown.

Length, 11 mm.; breadth, 7 mm.

S. India: Nilgiri Hills (*H. L. Andrewes*).

Type in M. René Oberthür's collection.

Harold has given the length of his type-specimen as 14 mm., but the examples known to me are considerably smaller.

237. **Onthophagus paliceps**, sp. n.

Black and opaque, with the head and lower surface shining, the antennæ (except the club) and mouth-parts deep red. The upper surface is devoid of hairs or setæ.

Oval and moderately convex. The *pronotum* is very minutely and sparsely punctured. The front angles are a little produced but blunt, the lateral margins are nearly straight in front and a little sinuate behind, and the base is gently rounded. The *elytra* are lightly striate, the intervals flat and extremely minutely and sparsely punctured. There is a slight tubercular elevation upon the suture just behind the base. The *pygidium* is opaque and bears only a few very minute punctures. The *metasternum* is very smooth, the shield bearing only a few punctures in front and the sides a very few fine scattered punctures.

♂. The clypeus is a little produced and feebly notched at the front margin, punctured at the sides and almost smooth in the middle. It is separated by a semicircular carina from the very lightly punctured forehead. The posterior margin of the head is produced in the middle as a short, slender, upward-curved horn, and on each side at the inner margin of the eye there is a shorter, transversely placed, rectangular erect process. The pronotum is a little hollowed transversely in front, nearly vertical in the middle, and the upper margin of the declivity has two blunt angulations placed rather far apart. The front tibia is short and broad, with its apical edge at right angles to the inner edge and the terminal tooth small and acute. The terminal spur is short and spatulate.

The female is unknown.

Length, 10–11 mm.; breadth, 6–6·5 mm.

U. Prov.: Dehra Dun (July).

Type in the British Museum.

One specimen was taken in Dehra Dun in July 1920. A second, in the British Museum without exact locality, is from the Reiche collection.

238. **Onthophagus nasalis**, *sp. n.*

Black and opaque above, including the antennæ, and without perceptible clothing, the lower surface shining and metallic, and with the black pygidium clothed with very scanty pale hairs.

Ovate and not very convex. The *head* is finely and closely punctured, flat and not very broad, the sides are gently rounded, the *clypeus* is produced and strongly reflexed in front, the reflexed margin rounded. There is a slight straight carina between the eyes. The *pronotum* is finely and fairly closely punctured, the punctures shallow and umbilicate. The front angles are produced and acute, the sides straight in front and very feebly sinuate behind, and the base obtusely angular

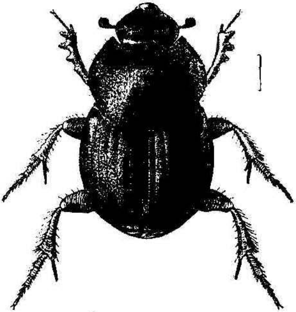

Fig. 33.—*Onthophagus nasalis*, ♂.

in the middle. The *elytra* are finely striate, the striæ minutely and sparingly punctured, and the intervals flat, with very minute and sparse granules. The *pygidium* is opaque and fairly strongly punctured. The metasternal shield is very unevenly and unequally punctured, and the sides of the *metasternum* are rather coarsely punctured.

♂. The pronotum is flattened and slopes gently from a little past the middle to the front margin. The front tibia is a little elongate and its external teeth are short and far apart.

The female is unknown.

Length, 6 mm.; breadth, 4 mm.

U. Prov.: W. Almora, Kumaon (*H. G. Champion*).

Type in the British Museum.

The type is unique.

239. **Onthophagus hindu**, sp. n.

Black, with the foot-stalk of the antenna and the scanty hairs upon the lower surface and legs dark red. The upper surface is opaque, except the posterior part of the head and anterior part of the pronotum in the male, and entirely devoid of hairs or setæ.

Oval and not very convex. The *head* is rather broad, the sides strongly rounded in front of the eyes and the clypeus bluntly bilobed in front. The *clypeus* is divided by a transverse carina from the forehead, and the posterior margin of the head bears a short horn or tubercle in the middle. The *pronotum* is finely and fairly closely punctured, the front angles are not very sharp, the sides feebly rounded in front and feebly sinuate behind, and the base is gently rounded. The *elytra* are shallowly but distinctly striate, with fine, fairly close punctures in the striæ, the intervals flat and minutely and very sparsely punctured. There is a minute tubercle upon the elytral suture just behind the base. The *pygidium* is opaque and minutely and sparsely punctured. The *metasternum* bears fine scattered punctures, a little larger and closer at the sides and at the front of the shield.

♂. The clypeus is strongly punctured and a little produced and strongly reflexed in front. The forehead is smooth and feebly punctured and a little elevated at the inner margin of each eye and in the middle. The middle of the posterior margin is produced backward as a sinuous sharp-pointed horn. The pronotum is smooth and shining in front, where it is slightly hollowed, and almost vertical in the middle. The front tibia is short, with short sharp teeth set at right angles to the inner margin. The terminal spur is very short and quadrate.

♀. The clypeus is closely rugose and the forehead strongly punctured, with a short conical process in the middle of the hind margin of the head. The terminal tooth of the front tibia is a little oblique and the spur long, sharp and slender.

Length, 8·5–11 mm.; breadth, 5–6 mm.

N.W. Frontier Prov.: Bannu (*Dr. Pennell*). C. Prov.: Nagpur, 1000 ft. (*E. A. D'Abreu*, Aug., Sept.). S. India: Yemmiganur, Bellary Dist. (Aug.).

Type in the British Museum.

The specimen from Yemmiganur was taken from a heap of decaying grasshoppers by the collector for the Coimbatore Agricultural College, and Mr. D'Abreu found a specimen "in putrid flesh." The insect can therefore be considered a carrion-feeder.

240. Onthophagus ephippioderus. (Plate XIII, figs. 1, 2.)

Onthophagus ephippioderus Arrow, Ann. Mag. Nat. Hist. (7) xix, *1907*, p. *425*.

Black or very dark brownish-black, with a slight coppery lustre upon the upper surface, devoid of hairy clothing above and almost devoid beneath, the head, pronotum, and lower surface shining and the elytra and pygidium subopaque.

Very broadly oval and convex. The *head* is produced in front. The *pronotum* is rather uniformly punctured (except the anterior part in the male), completely margined, with the anterior angles blunt and the base not angulate in the middle. The *elytra* are finely striate, the striæ containing minute punctures and the intervals minutely and sparsely punctured. The *pygidium* is rather finely and sparingly punctured, the lower surface almost unpunctured.

♂. The *clypeus is punctured, shining, and produced into* a blunt, gently recurved process, and has a rather short, rounded carina behind; the forehead is produeed outward on each side above the eye as a gently recurved pointed process, and the vertex is produced backward in the middle as a slender curving horn. The anterior part of the pronotum is retuse, smooth and shining, the dorsal part is horizontally produced forward on each side as a blunt process, the two processes rather far apart, with a cavity on the outer side of each. The front tibia is a little elongate and its terminal spur short and broad.

♀. The clypeus is transversely rugose, bluntly produced in front, with the margin abruptly reflexed and the posterior carina longer and strongly elevated. The vertex bears au ereet quadrate lamina, with its angles slightly produced. The pronotum is strongly punctured everywhere. The front tibia is broad aud its terminal spur rather narrow.

Length, 10–13·5 mm.; breadth, 6–7·5 mm.

BOMBAY: Belgaum (*H. E. Andrewes*); Kanara (*T. R. D. Bell*). S. INDIA: Nilgiri Hills (*H. L. Andrewes*); Chikkangalur, Bangalore.

Type in the British Museum.

241. Onthophagus mirandus, sp. n.

Black, opaque above, with the head, pygidium, and lower surface shining and feebly metallic (as well as the front margin of the pronotum in the male). The antennal club is black. There are a few minute pale setæ upon the upper surface and long but rather scanty reddish hairs beneath.

Broadly oval, convex. The *head* is broad, the sides strongly rounded before the eyes, the *clypeus* a little produced, lightly

excised in the middle of the front margin and separated from the forehead by a curved carina. The *pronotum* is rather closely and evenly, not very finely, punctured, with a light median longitudinal groove upon the posterior half. The front angles are bluntly rounded, the sides almost straight in front, feebly sinuate behind, and the base margined and evenly rounded. The *elytra* are finely striate, the intervals flat and minutely and fairly numerously granulate, each granule giving rise to a minute seta. The *pygidium* is shining and fairly strongly and closely punctured. The *metasternum* is strongly, but not at all closely, punctured.

♂. The head is very smooth, with a few scattered punctures only, the clypeus rather strongly produced, feebly emarginate or nearly straight in the middle, the head behind the eyes

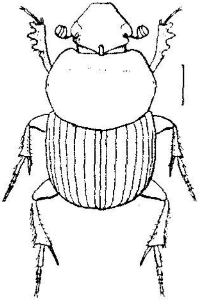

Fig. 34.—*Onthophagus mirandus*, ♂.

produced backward, forming an outwardly directed angle above each eye, and in the middle narrowed and produced upward as a short, slender, recurved horn. The pronotum is a little hollowed at the front margin, where it is very smooth and shining.

♀. The clypeus is feebly produced and strongly and rather rugosely punctured, the forehead strongly and sparingly punctured, with a straight posterior carina. The pronotum is vertical in the middle of the front margin, where there is a slight double prominence above.

Length, 7–8 mm.; breadth, 4–4·5 mm.

U. Prov.: W. Almora, Kumaon (*H. G. Champion*). Punjab: Simla (Pusa Coll., July).

Type in the British Museum.

242. Onthophagus kuluensis.

Onthophagus kuluensis Bates,* Entom. xxiv, 1891, Suppl. p. 12.

Black, shining beneath and opaque upon the posterior part of the pronotum, the elytra and pygidium, the head and the anterior part of the pronotum sometimes feebly metallic, the antennæ dark, the mouth-organs and tarsi red, the lower surface thinly clothed with yellow setæ, and the elytra bearing minute and inconspicuous pale setæ at the sides.

Oval and moderately convex. The *head* is fairly broad, the ocular lobes are rounded externally, and the *clypeus* is nearly straight in front, with its sides nearly straight and convergent. The clypeus is separated from the finely punctured forehead by a straight carina extending from side to side.

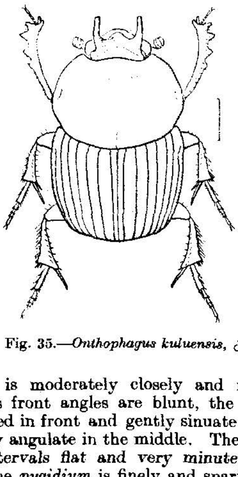

Fig. 35.—*Onthophagus kuluensis*, ♂.

The *pronotum* is moderately closely and not very finely punctured. Its front angles are blunt, the lateral margins are feebly curved in front and gently sinuate behind, and the base is obtusely angulate in the middle. The *elytra* are finely striate, the intervals flat and very minutely and sparsely punctured. The *pygidium* is finely and sparingly punctured, the metasternal shield very finely and sparingly, and the sides of the *metasternum* are sparingly but more strongly punctured.

♂. The head is very smooth, with only very minute and inconspicuous punctures. Its hinder edge is produced backward as an upward-curving lamina, the outer angles of which form a pair of nearly parallel horns connected by a ridge which is more or less angularly folded in the middle. The pronotum

falls rather steeply in front, where it is rather smooth and shining. The front legs are long, the tibia slender and strongly curved, with the four external teeth short and far apart, the tip produced into a short finger-like process, and the terminal spur short and blunt.

♀. The clypeus is transversely rugose and the vertex bears a strong straight carina between the eyes.

Length, 7–8·5 mm. ; breadth, 4–5 mm.

KASHMIR : Afan, 5500 ft., Dorus, 6000 ft., and Putshai, Lolab Valley (*C. F. C. Beeson*, May). PUNJAB : Camp Thobba, Murree Hills (*Howland Roberts*) : Fagu, Simla Hills (*S. N. Chatterjee*, Sept.) ; Simla (*E. C. Ansorge*) ; Kulu (*Dr. Pennell*). U. PROV. : Mussoorie, 7000 ft. (*Col. Harcourt*, July) ; Kemti Falls (*M. Cameron*, May).

Type in M. René Oberthür's collection : co-types in the British Museum.

243. Onthophagus armatus.

Onthophagus armatus Bl.,* Voy. au Pôle Sud, 1853, p. 98, pl. 7, figs. 9 & 10 ; Bouc., Ann. Soc. Ent. France, lxxxiii, 1914, p. 305.
Onthophagus luzonicus Lansb., Notes Leyd. Mus. v, 1883, p. 51.

Black, shining, without hair or setæ above, the antennæ and mouth-organs yellow, and the tarsi, and sometimes also the tibiæ and the anterior part of the clypeus, reddish.

Broadly oval and compact, moderately convex. The *head* is large and broad, with the eyes, as seen from above, rather large but separated by about three times their length. The middle of the clypeal margin is straight or feebly excised. The *pronotum* is finely and not closely punctured. The front angles are rather blunt, the lateral margins nearly straight in front and very feebly sinuate behind, the base gently rounded. The *elytra* are deeply striate, the striæ rather strongly punctured, the intervals convex and very minutely and sparsely punctured. The *pygidium* is rather finely and not very closely punctured. The metasternal shield is moderately punctured at the sides, smooth in the middle, and the sides of the *metasternum* are finely and sparsely punctured.

♂. The clypeus is finely punctured, with its front margin strongly reflexed and bluntly biangulate in the middle, and separated by a nearly straight carina from the flat and feebly punctured forehead. The posterior margin of the head is produced backward as a broad smooth lamina, gently curving upward, its outer angles forming a pair of short horns, which curve strongly towards each other. The pronotum is very convex in front and has a slight smooth depression on each side, leaving the anterior middle part slightly prominent.

♀. The clypeus is closely transversely rugose and separated

by a curved carina from the forehead, usually with another feebler carina close to it. The posterior margin of the head bears a strongly elevated vertical carina. The front margin of the pronotum is narrowly but rather abruptly vertical in the middle.

Length, 7–8 mm. ; breadth, 4–5 mm.

ASSAM : Cachar (*W. Grant*). BURMA : Bhamo (*L. Fea*, July) ; Teinzo (*L. Fea*, May) ; Shwegu-Myo (*L. Fea*, Oct.). TONKIN. PHILIPPINE IS. JAVA.

Type in the Paris Museum.

244. **Onthophagus semicinctus.**

Onthophagus semicinctus d'Orb.,* Ann. Soc. Ent. France, lxiv, 1897, p. 242 ; L'Abeille, xxix, 1898, p. 215.
Onthophagus bufo Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 420 (new syn.).

Black and subopaque, with the head, the anterior part of the pronotum and the lower surface shining, the antennæ and tarsi reddish and with extremely minute and scanty pale setæ upon the upper surface.

Oval and not very convex. The *head* is broad, with the eyes rather large, the ocular lobes strongly rounded externally, and the *clypeus* a little produced and feebly excised in front. The *pronotum* is moderately closely punctured with intermixed large and small punctures. The front angles are a little produced but not sharp, the lateral margins straight in front and feebly sinuate behind, and the base rounded. The *elytra* are finely striate, the intervals flat, with very scanty minute granules. The *pygidium* is opaque and very minutely and scantily punctured, the *metasternum* rather finely, the punctures scattered upon the shield and a little closer upon the sides.

♂. The clypeus is fairly closely punctured, the forehead finely and very sparsely, and the vertex is armed with a pair of very short, unconnected, parallel horns, sloping obliquely backward, rather broad at the base and tapering to a point at the tip. The pronotum is sloping or slightly hollowed and smooth in front.

♀. The clypeus is transversely rugose, separated by a fine, slightly curved carina from the forehead, with a straight carina, a little acuminate in the middle, behind the first, the vertex bearing rudimentary horns and the forehead fairly closely punctured.

Length, 6–8·5 mm. ; breadth, 4–5 mm.

SIND : Karachi (*M. Maindron*, Aug., Sept.). N.W. FRONTIER PROV. : Bannu (*Dr. Pennell*). BOMBAY : Khandesh (*T. R. D. Bell*). C. PROV. : Nagpur (*E. A. D'Abreu*).

Type in the Paris Museum ; co-type in the British Museum ; also the type of *O. bufo*.

245. **Onthophagus ruficauda**, sp. n.

Black, with a faint coppery or metallic suffusion upon the upper surface, the pygidium, antennæ, and tarsi red, and the elytra with a very scanty and inconspicuous clothing of minute pale setæ.

Oval, compact, and convex. The *head* is broad, strongly rounded at the sides and truncate or feebly excised in the middle of the front margin. The *clypeus* is separated by two parallel curved carinæ from the well-punctured forehead. The *pronotum* bears large umbilicate punctures, rather close laterally and more scattered dorsally, where they are intermixed with finer punctures. The front angles are rather sharp, the sides nearly straight in front and behind, and the base is feebly curved. The *elytra* are finely striate, the intervals almost flat, finely coriaceous, with minute scattered tubercles. The *pygidium* is shining at the apex, subopaque at the base, and bears shallow, not very close, punctures. The metasternal shield bears scattered unequal punctures and the sides of the *metasternum* fairly large but not close punctures.

♂. The clypeus is closely punctured and the vertex bears a pair of horns arising from the inner margins of the eyes, directed obliquely backward, diverging strongly and nearly straight. The pronotum is flat, smooth and sloping in front, the declivity rounded and not sharply limited above.

♀. The clypeus is closely transversely rugose and the vertex bears a strongly elevated carina. The pronotum is vertical and smooth in the middle of the front margin and the top of the declivity forms a broad, doubly rounded prominence.

Length, 6–7 mm.; breadth, 4–4·5 mm.

Burma: Paungde (*G. Q. Corbett*); Toungoo (*G. Q. Corbett*); Tharrawaddy (*G. Q. Corbett*); Mandalay (*H. L. Andrewes*, June).

Type in the British Museum.

246. **Onthophagus denticornis.**

Onthophagus denticornis Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 230.

Red, with the head and front tibiæ black, the elytra thinly clothed with minute pale setæ. The normal colour may perhaps be entirely black and the red colour due to immaturity in the type-specimens.

Moderately shining, oval, and convex, the upper surface rather closely and not very finely punctured. The *pronotum* is strongly and moderately closely punctured, a little wider than the elytra, slightly transverse, strongly rounded at the sides, with the front angles bluntly produced, the lateral margins feebly sinuate before the hind angles, and the base

completely and distinctly margined and very obtusely angulate in the middle. The *elytra* are distinctly striate, the striæ faintly punctured, the intervals scarcely convex and closely punctured. The *pygidium* is rather strongly and fairly closely punctured, the metasternal shield sloping and hairy in front, and the sides of the *metasternum* are coarsely punctured and hairy.

♂. The clypeus is finely and closely punctured, separated by a complete, straight, strongly elevated carina from the forehead, its front margin angularly produced and strongly reflexed in the middle. The vertex bears a sharp median tubercle and behind it a pair of long horns inclined backward, placed rather close together and nearly parallel at the base, diverging a little near the extremities each horn having a sharp tooth at its inner edge a little above the base. The pronotum is slightly flattened, very smooth and shining in the middle of the anterior part, with a pair of small sharp tubercles in the middle at about a third of the length, and the posterior part longitudinally grooved.

Length, 10–12 mm.

TENASSERIM : Mt. Mooleyit, 1800–3600 ft. (*L. Fea*, March).

Type in the Genoa Museum ; co-type in M. Boucomont's collection.

247. Onthophagus agnus.

Onthophagus agnus Gill.,* Ann. Soc. Sci. Brux. xliv. 1925, p. 233.

Black and shining, with the elytra and pygidium subopaque, the antennæ, mouth-organs and tarsi red.

Oval and not very convex. The *head* is broad and almost semicircular, with the front margin strongly reflexed, a little more elevated and feebly bilobed in the middle. The eyes are moderately large, seen from above. The *pronotum* is fairly strongly and not closely punctured. The lateral margins are nearly straight in front, gently sinuate behind, the front angles rather blunt, the hind angles obsolete and the base gently rounded. The *elytra* are finely striate, the striæ lightly punctured, the intervals flat or feebly convex, slightly opaque and minutely and sparsely punctured. The *pygidium* is opaque and rather finely and sparingly punctured. The metasternal shield is finely and sparingly punctured, with the anterior part more closely punctured, and the sides of the *metasternum* are sparingly and not very strongly punctured.

♂. The clypeus is short, shining, evenly but not very strongly or closely punctured, separated by a curved carina from the forehead, which is rather finely punctured and bears a slight transverse tubercle just behind the carina. The posterior margin forms a sharp curved carina, produced obliquely

upward and backward at each end as a pair of short straight horns. The pronotum is rather sloping in the middle of the front margin.

♀. The clypeus is a little longer than in the male, closely transversely rugulose, and divided from the forehead by two sharp, rather close, curved carinæ. The posterior margin is elevated into a nearly straight carina. The pronotum is generally narrowly vertical in front, with a slight blunt tubercle on each side of the middle of the top of the declivity. This declivity and the tubercles may, however, be absent.

Length, 6–9 mm.; breadth, 4–5 mm.

BENGAL: Calcutta (*M. O. T. Iyengar*, Feb.); Berhampore (*E. T. Atkinson*). CHOTA NAGPUR: Ranchi. C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June, July, Sept., Oct.); Korai, Seoni Dist., 2000 ft. (*E. A. D'Abreu*, Oct.). C. INDIA: Mhow. S. INDIA: Kanara (*T. R. D. Bell*).

Type in Dr. Gillet's collection.

This was found by Mr. D'Abreu in cow-dung, and a specimen was also taken by him from the stomach of a white-breasted water-hen.

248. **Onthophagus urellus.**

Onthophagus urellus Bouc.,* Ann. Soc. Ent. France, lxxxviii, 1919, p. 310.

Black, smooth and shining, with the legs and lower surface reddish, the antennal club and mouth-parts yellow, and the posterior part of the head sometimes more or less coppery.

Rather broadly oval, convex. The *head* is short and broad, the sides rather strongly dilated, and the front margin entire, well reflexed, and nearly semicircular. The *pronotum* is rather coarsely and evenly and fairly closely punctured. The front angles are blunt, the sides feebly rounded in front and feebly sinuate behind, and the base uniformly rounded. The *elytra* are deeply striate, the striæ closely puncturedand the intervals slightly convex, not very finely nor very sparsely punctured. The *pygidium* is subopaque and fairly strongly and closely punctured, the metasternal shield very sparsely and finely, and the sides of the *metasternum* sparsely but a little more strongly.

♂. The clypeus is closely and rather rugosely punctured, and separated from the strongly punctured forehead by a strong curved carina, the extremities of which are produced upward as short, erect, flattened horns, truncate at the end. The carina joining the horns bears two blunt teeth rather far apart. The pronotum is vertical in front and smooth or lightly punctured, and the upper anterior margin is produced into four blunt processes, of which the two inner ones are close together and in advance of the other two.

♀. The clypeus is transversely rugulose, bears a strongly rounded carina anteriorly, and is separated from the strongly punctured forehead by another nearly straight carina, which is slightly acuminate in the middle. There is a third strong straight carina behind the eyes. There is a short vertical surface in the middle of the front margin of the pronotum, with its upper edge straight.

Length, 8·5–10 mm.; breadth, 5–5·5 mm.

BURMA: Pegu.

Type in M. Boucomont's collection.

Var. **nilgirinus**, nov.

Specimens from the Nilgiri Hills agree with typical Burmese examples in all but slight differences in the male armature. The cephalic horns are slighter and the connecting carina is stronger and less distinctly toothed. The pronotum is strongly produced forward in the middle, but the four angulations of the margin of the produced part are indistinct.

S. INDIA: Nilgiri Hills (*H. L. Andrewes*).

249. **Onthophagus tragoides.**

Onthophagus tragoides Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 230.

Black, smooth and shining, with a slight coppery lustre upon the head, pronotum, and pygidium, the antennæ and mouth-organs yellow, and the tarsi reddish.

Broadly oval and compact, not very convex. The *head* is moderately broad, with the sides broadly rounded, the *clypeus* notched in the middle and gently rounded at the sides, separated from the shining, moderately punctured forehead by a strongly curved carina. From the inner margins of the eyes arise a pair of short horns, sloping a little backward, parallel, broad at the base and sharply pointed at the end. The *pronotum* is strongly but not very closely punctured, with the middle of the front margin more finely and sparingly punctured. The front angles are blunt, the lateral margins nearly straight in front and very feebly sinuate behind, and the base gently rounded. The *elytra* are very strongly and deeply striate, the striæ closely punctured, the intervals rather convex and sparingly but not very minutely punctured. The *pygidium* is rather finely and sparingly punctured. The metasternal shield is smooth in the middle and moderately punctured at the sides, and the sides of the *metasternum* are strongly punctured.

♂. The clypeus is strongly punctured and feebly notched in the middle of the front margin. The pronotum is sometimes a little hollowed on each side of the middle of the front margin,

leaving a slight, rounded, median prominence. The front tibia is very short and broad, with its front edge straight and at a right angle to the inner margin, and the four external teeth are very short. The terminal spur is very short, broad, and truncate.

♀. The clypeus is closely transversely rugose, a little produced and deeply notched in front, and there is a fine supplementary carina just in front of the clypeo-frontal carina. The front tibia is broad, its front margin is oblique, the terminal tooth rather long, and the spur very long, slender, and curved.

Length, 6–7 mm.; breadth, 4–4·5 mm.

TENASSERIM: Meetan (*L. Fea*, April). INDO-CHINA.

Type in the Genoa Museum.

Although the sexual differences are well marked, the horns are similar in both sexes. The peculiar form of the front tibia and tibial spur of the male evidently indicate an affinity with the genus *Caccobius*, but in that the two sexes have the tibia of the same form.

250. **Onthophagus taprobanus**, sp. n.

Black and shining, with the antennæ, mouth-parts, and hairy clothing of the under surface rust-red.

Oval and not very convex. The *head* is smooth and not very broad, with the eyes not very small, the *clypeus* a little produced and nearly straight in the middle of the front margin, and the sides of the head very bluntly angular. The clypeus is almost obsoletely rugose, separated by a feebly curved carina from the forehead, which is very smooth and bears a conical tubercle in the middle. The *pronotum* is finely and closely punctured, with a smoother area at the front margin, where there is a slight, narrow, median excavation, the upper edge on each side produced forward as a slight angular process. The front angles are blunt, the lateral margins nearly straight in front, feebly sinuate behind, and the base gently rounded. The *elytra* are deeply striate, the striæ rather faintly punctured, the 7th feebly curved, the intervals slightly convex and very minutely irregularly punctured. The *pygidium* is moderately finely and closely punctured. The *metasternum* is entirely unpunctured in the middle, and the sides are rather closely punctured.

♂. The front margin of the clypeus is gently reflexed.

♀. The clypeus is flat and has a strong curved carina uniting the genal sutures on each side.

Length, 7·5–8·5 mm.; breadth, 5–5·5 mm.

CEYLON: Bogawantalawa, 4000–5200 ft. (*G. Lewis*, Feb., Mar.); Dikoya, 3800–4200 (*G. Lewis*, Dec., Jan.).

Type in the British Museum.

251. Onthophagus coracinus.

Onthophagus coracinus Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 214.

Black and shining, with the antennæ, mouth-parts, and tarsi red.

Compactly oval, not deeply waisted, moderately convex. The *head* is rather broad, nearly semicircular, strongly and closely sculptured, and bears two short transverse carinæ, the anterior one curved and not very far from the clypeal margin. The *pronotum* is fairly strongly, closely, and evenly punctured. The lateral margin is nearly straight in front, with the front angle almost rectangular, and very feebly sinuate behind, the hind angle entirely obsolete, the base rounded and finely margined. The *elytra* are deeply striate, the striæ strongly punctured, the intervals rounded and finely and sparingly punctured, the 7th interval a little dilated in the middle. The *pygidium* is very strongly and not closely punctured. The metasternal shield is finely and sparingly punctured, with a few large punctures at the sides and a deep median groove, and the sides of the *metasternum* are strongly but not closely punctured.

♂. The clypeus is very short, strongly and closely punctured. The pronotum has a very short, nearly vertical front margin.

♀. The clypeus is a little longer and closely transversely rugulose. The pronotum is simply convex.

Length, 8 mm.; breadth, 4·5 mm.

BURMA: Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.). INDO-CHINA.

Type in the Genoa Museum.

252. Onthophagus fossor, sp. n.

Entirely black, not very shining, with the antennæ of the same colour, the lower surface sparingly clothed with reddish setæ.

Oval and not very convex. The *head* is moderately long, not broad, with the ocular lobes gently rounded, and the *clypeus* rather narrowly rounded in front. The *pronotum* is fairly strongly, closely and evenly punctured, except at the front margin. The front angles are blunt, the sides nearly straight in front and behind, and the base obtusely angular in the middle. The elytra are finely striate, with the intervals flat and distinctly, not very minutely, punctured. The *pygidium* is opaque and finely irregularly punctured. The metasternal shield is finely and sparsely punctured, and the sides of the *metasternum* strongly and not closely.

♂. The head is flat, smooth, and very finely and sparsely punctured, the clypeus bluntly pointed and strongly reflexed in front, and the posterior part of the head produced backward

and giving rise to a pair of upward-curving horns, not far apart and converging at the tips, each with a broad, sharply angular expansion at the base. The pronotum is smooth, and slopes steeply but not abruptly in front. The front tibia is long and narrow, with rather feeble teeth.

♀. The clypeus is densely rugose and completely separated by a straight carina from the punctured forehead. There is a second straight carina between the eyes. There is a slight rounded prominence just behind the front margin of the pronotum in the middle.

Length, 7–8 mm. ; breadth, 4·5–5 mm.

SIKKIM : Tsuntang, 6000 ft. (*R. W. G. Hingston*, April).

Type in the British Museum.

253. **Onthophagus triceratops.**

Onthophagus triceratops, Arrow, Rec. Ind. Mus. viii, 1913, p. 195.

Black and shining, with a faint metallic suffusion, most apparent upon the head and the front of the prothorax, and with the antennæ, mouth-organs, and tarsi red. The upper surface is without hairs or setæ.

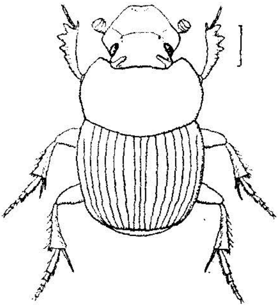

Fig. 36.—*Onthophagus triceratops*, ♂.

Broadly oval and moderately convex. The *head* is broad and angularly dilated in front of the eyes, which are rather large as seen from above. The *pronotum* is evenly, but not very closely nor very finely, punctured. The front angles are pointed but not very sharp, the sides nearly straight in front and behind, and the base is gently rounded. The *elytra* are strongly striate, the striæ rather closely punctured, the intervals slightly convex and finely punctured. The

pygidium is finely and irregularly punctured. The metasternal shield is smooth in the middle and lightly punctured at the sides, and the sides of the *metasternum* are fairly strongly but not closely punctured.

♂. The head is shining, the clypeus evenly but not strongly punctured, truncate, and strongly reflexed in front, and divided by a feeble straight carina from the forehead, which is very minutely and sparsely punctured. The posterior part of the head is produced backward as a broad flat plate, dilating behind, with its outer angles drawn upward into strongly curved and convergent horns. The front of the pronotum is nearly vertical, its upper margin rounded and almost straight.

The female is unknown.

Length, 8–8·5 mm. ; breadth, 4·5–5 mm.

N.E. Assam : Sadiya (*S. Kemp*, Nov.).

Type in the British Museum ; co-type in the Calcutta Museum.

254. **Onthophagus bison.**

Onthophagus bison Bouc.,* Ann. Soc. Ent. France, lxxxviii, 1919, p. 309.

Black, smooth and shining, with the legs and lower surface deep reddish and the antennal club and mouth-organs yellow.

Rather broadly oval, convex. The *head* is short and broad, the sides rather strongly dilated, and the front margin entire and nearly semicircular. The *pronotum* is fairly strongly punctured, rather closely and evenly in the female, finely and sparsely at the sides in the male, more strongly and closely in the middle. The front angles are blunt, the sides feebly rounded in front and feebly sinuate behind, and the base evenly rounded. The *elytra* are strongly striate, the striæ closely punctured, and the intervals slightly convex, minutely and very sparsely punctured. The *pygidium* is fairly strongly punctured. The metasternal shield is smooth and scarcely perceptibly punctured, and the sides of the *metasternum* bear a few scattered punctures.

♂. The clypeus is densely and rather rugosely punctured, and bears a sharp curved carina in its posterior part. It is separated from the smooth forehead by a strongly elevated, vertical, broad lamina curving slightly backward, with its outer angles a little produced upward. The pronotum is smooth and hollowed in front, the upper margin of the cavity produced forward and broadly bifurcate. There is a slight lateral tooth on each side of the median process. The spur of the front tibia is short, broad, and truncate at the end.

♀. The clypeus is closely transversely rugulose and bears

a sharp curved carina in its posterior part. A similar and parallel carina separates it from the finely punctured forehead, the middle of which bears a short conical tubercle. The pronotum has a very short broad prominence at the middle of its anterior part, the prominence sinuate in the middle. The spur of the front tibia is slender, curved, and acute.

Length, 8 mm. ; breadth, 5 mm.

BURMA : Pegu.

Type in M. Boucomont's collection.

In small males the head bears two carinæ, of which the anterior one is curved and the posterior one straight and a little stronger than the other. The pronotum bears a curved transverse ridge just above the front margin.

255. **Onthophagus tragus.**

Scarabæus tragus F.,* Ent. Syst. i, 1792, p. 56.
Onthophagus tragus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 229.

Shining black, sometimes with the head and thorax slightly metallic, the antennæ and mouth-organs yellow and the tarsi red. The lower surface is clothed with extremely scanty pale setæ, and the upper surface is entirely without clothing.

Broadly oval and not very convex. The *head* is broad, the eyes (seen from above) are fairly large, the sides of the head are bluntly angular, and the clypeal margin is feebly bilobed in the middle. The *pronotum* is distinctly, but not very strongly nor very closely, punctured. The front angles are blunt, the lateral margins nearly straight in front and feebly sinuate behind, and the base gently rounded. The *elytra* are strongly striate, the striæ contain fairly numerous and distinct punctures, and the intervals are slightly convex and very sparsely and minutely punctured, except at the sides, where the punctures are larger. The *pygidium* is opaque and rather finely and sparingly punctured. The metasternal shield is distinctly punctured at the sides and almost smooth in the middle, and the sides of the *metasternum* are fairly strongly but not closely punctured.

♂. The clypeus is finely punctured and shining, separated by a strongly curved carina from the smooth, finely and sparsely punctured forehead. At the inner margin of each eye arises a slightly compressed and nearly straight horn, inclined a little backward, the two horns parallel and entirely separate. The pronotum is vertical and nearly smooth at the front margin, the upper edge of which is rounded. The front tibia is armed with four rather short external teeth, the terminal one at a right angle to the tibia, of which the front edge is straight. The terminal spur is very short, broad, and flat.

In certain males a minute tooth appears between the two horns, and in others this is produced into a median process, while the lateral horns are correspondingly reduced. Occasionally the median tooth is longer than the lateral processes.

♀. The clypeus is closely rugose and separated from the well-punctured but shining forehead by a nearly straight carina, in front of which a second slighter carina, nearly parallel with it, is present. The vertex bears a strong median tubercle and a slight tooth on each side adjoining the eye. The terminal tooth of the front tibia is oblique and long and the spur elongate and strongly curved.

Length, 7–9 mm. ; breadth, 4–5 mm.

BOMBAY : Belgaum (*H. E. Andrewes*). BENGAL : Berhampore (*E. T. Atkinson*). BURMA : Maymyo (*H. L. Andrewes*) ; Bhamo (*L. Fea*, April, July) ; Shwegu-Myo (*L. Fea*, Oct.) ; Asciuii Gheeu, Karen Hills, 4200–4500 ft. (*L. Fea*, April). TONKIN. S. CHINA. JAVA.

Type in the Copenhagen Museum.

256. **Onthophagus sagittarius.** (Plate XII, figs. 4, 5.)

Onthophagus sagittarius F.,* Syst. Ent. 1775, p. 24.
Scarabæus oryx F.,* Ent. Syst. i, 1792, p. 56.
Copris erecta Wied.,* Zool. Mag. i, 3, 1819, p. 157.
Copris obtusa Wied.,* op. cit. p. 158.

Testaceous yellow, closely mottled with dark brown above and less closely beneath, the head and pronotum dark brown, with a slight metallic lustre, and the latter with the sides and base yellow or mottled with yellow, the pygidium pale, the middle of the metasternum and the margins of the ventral sternites dark.

Oval, moderately compact, fairly convex, not very shining, devoid of hair or setæ above, and very scantily hairy beneath. The *head* is subcircular, with the clypeal margin reflexed but not produced. The *pronotum* is smooth in front and well punctured behind, with the lateral margins rounded in front, the front angles blunt, and the base extremely finely margined and very feebly prominent in the middle. The *elytra* are strongly striate, with minute punctures in the striæ, the intervals flat, finely and sparsely punctured, except at the sides, where the punctures are stronger and more numerous. The *pygidium* is finely and sparingly punctured, the *metasternum* is smooth in the middle and fairly strongly punctured at the sides.

♂. The head is very smooth and shining. The clypeus bears a pair of erect horns upon the line of the clypeo-frontal suture, placed near the outer margins and rather far apart, and the vertex is without elevation. The pronotum is highly convex, with its anterior part declivous, very smooth at the sides

and slightly prominent and feebly punctured in the middle, usually with a minute median tubercle at the top of the declivity. The front tibia is a little elongate and rather strongly curved.

♀. The clypeus is transversely rugose and separated from the forehead by a strongly elevated straight carina. The vertex bears an erect horn, directed a little forward at first, and curving slightly backward. The anterior part of the pronotum is declivous, smooth, and shining, and the top of the declivity is produced horizontally forward in the middle as a tapering pointed process. The front tibia is very broad.

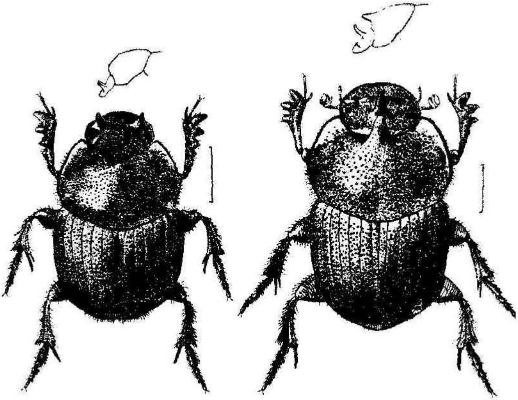

Fig. 37.—*Onthophagus sagittarius*, ♂ (left) and ♀ (right), and profiles of head and thorax.

Small females may show only a short conical elevation upon the head and a feebly prominent transverse ridge upon the thorax.

Length, 8·5–11 mm.; breadth, 4·5–6 mm.

U. Prov.: Dehra Dun (Jan.). C. India: Jaithari Range, Umaria, Rewah State (*C. F. C. Beeson*, Nov.). Bengal: Calcutta (*Ribbe*). Assam: Srimangal, Sylhet Dist. (*C. F. C. Beeson*, May). Burma: Bhamo (*L. Fea*, Aug.); Rangoon (*L. Fea*, May); Palon, Pegu Div. (*L. Fea*, Sept.); Mandalay (*L. Fea*, May). Malay Peninsula. Java. S. China.

Found in dung.

Type in the British Museum: that of *oryx* F. in the Copenhagen Museum; those of *obtusa* (♂) and *erecta* (♀) in the Hamburg Museum.

This is a very remarkable insect, of which the best armed individuals are not, as usual, the males, but the females. In the male the thoracic horn found in the female is represented only by a minute tubercle, and there is no trace whatever of the frontal horn. Instead there is a pair of short lateral horns which have nothing to do with the latter, but arise in a different position and correspond with the anterior carina of the female.

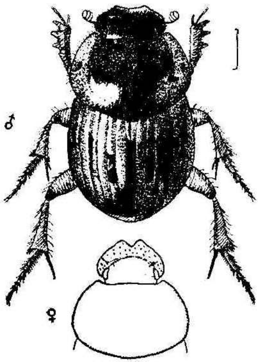

Fig. 38.—*Onthophagus difficilis*, ♂, and anterior part of ♀.

257. **Onthophagus difficilis.**

Onthophagus difficilis Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 209.

Testaceous yellow, very smooth and shining, with the head, the pronotum, except an irregular lateral margin, sometimes fragmentary, longitudinal stripes (sometimes partially coalescing) upon the 1st, 3rd, 5th, and 7th elytral intervals, not reaching the base or apex, dark chocolate-brown or nearly black. The basal part of the pygidium and parts of the lower surface of the body may also be dark. There is a scanty clothing of pale yellow setæ, extremely minute and inconspicuous upon the upper surface.

Broadly oval, not very convex. The *head* is broad but not

angulate at the sides. The *pronotum* is very smooth, with a few irregularly scattered fine punctures, a little larger at the sides. The front angles are blunt, the lateral margins feebly rounded in front and slightly sinuate behind, and the base gently rounded and finely margined. The *elytra* are very strongly striate, the striæ closely punctured, the intervals convex, with a very few minute scattered punctures. The *pygidium* bears a few minute punctures, and the *metasternum* is extremely smooth, with a few fairly large punctures at the sides.

♂. The head is very smooth, with a very few punctures on each side, the clypeus not separated from the forehead, its front margin gently reflexed and excised, with the angles slightly prominent. The pronotum bears a minute tubercle on each side, nearly midway between the centre and the lateral margin, and is flattened between the tubercle and the front margin.

♀. The clypeus is a little produced, deeply notched in front and bluntly bilobed. It bears a few large granules and is separated by a curved carina from the forehead, which is smooth and bears a small median tubercle. The pronotum is evenly convex.

Length, 7–8·5 mm. ; breadth, 4–5 mm.

S. INDIA : Kodaikanal. CEYLON : Trincomalee (*C. F. S. Baker*, June, Sept.) ; Colombo, coast level (*G. Lewis*, April) ; Yala, S. Prov. (*T. Bainbrigge Fletcher*, Feb.).

Type in the British Museum.

258. **Onthophagus transcaspicus.**

Onthophagus transcaspicus Koenig, Horæ Ent. Soc. Ross. xxiii, 1889, p. 302 ; d'Orb., Ann. Soc. Ent. France, lxxxii, 1913, p. 132.
Onthophagus lineatus Reitt.,* Verh. Nat. Ver. Brünn, xxvii, 1888, p. 102 (preocc.).

Deep chocolate-brown or black, sometimes with a faint metallic suffusion, the elytra testaceous yellow, with the striæ and the lateral margins black and the 1st, 3rd, 5th, and 7th intervals brown or black, except at the anterior and posterior ends. The dark colour sometimes spreads into the intervening intervals in the middle region of the elytra. The pygidium, antennæ, and mouth-organs are pale, and the upper surface of the body bears extremely minute scattered pale setæ.

Oval and not very convex, the head and pronotum shining, and the elytra less shining. The *head* is moderately broad, with the clypeal margin strongly reflexed and very feebly emarginate in the middle, and the sides obtusely angulate. The *clypeus* is separated from the forehead by a rounded carina, angularly elevated in the middle. The *pronotum* is strongly

but unevenly punctured, except in the anterior part in the male, the large punctures being interspersed with fine ones. The front angles are slightly produced but not sharp, the lateral margins are nearly straight in front and sinuate behind, and the base is well rounded. The *elytra* are strongly striate, the striæ punctured, the intervals flat, with minute and very sparsely scattered granules. The *pygidium* is opaque and very sparsely and finely punctured. The metasternal shield is very finely and sparsely punctured, and the sides of the *metasternum* rather more strongly.

♂. The clypeus is finely punctured and shining, and the posterior part of the head bears a pair of nearly parallel horns directed obliquely backward, with an angular dilatation at the base of each internally. The anterior margin of the pronotum slopes very steeply and is very smooth.

♀. The clypeus is rugosely punctured and bears a fine rounded carina immediately in front of the clypeo-frontal carina. The vertex bears a pair of strong conical horns directed obliquely backward.

Length, 8–9·5 mm. : breadth, 4–5 mm.

WAZIRISTAN (*Rev. G. Palacios*, Mar., April). TURKESTAN. ARABIA. ALGERIA. SOMALILAND.

Type unknown ; co-type of *lineatus* in the British Museum.

259. **Onthophagus hamaticeps**, sp. n.

Black and very shining, with the head and pronotum dark coppery and the elytra red at the shoulders and posterior margins. The legs, antennæ, and mouth-organs are also red.

Oval, compact, and convex, entirely devoid of hair or setæ above. The *head* is short and broad, subangulate on each side in front of the eyes. The *pronotum* is fairly finely and not very closely punctured, the front angles are rounded, the sides are gently curved in front and behind, and the base is strongly rounded. The *elytra* are finely striate, with indistinct and remote punctures in the striæ, the 7th stria strongly curved, the intervals flat and very minutely and sparsely punctured. The *pygidium* is sparsely but rather strongly punctured. The metasternal shield is strongly punctured in front, very finely and sparsely behind, and the sides of the *metasternum* are coarsely but not closely punctured. The front angles of the prothorax are very slightly hollowed beneath.

♂. The clypeus is finely and sparsely punctured, with its front margin a little excised in the middle. The posterior part of the head bears an elevated crescent, the two ends of which are produced obliquely forward and upward as short,

stout, parallel horns. The head between them is hollowed and very smooth.

The female is unknown.

Length, 3 mm. ; breadth, 2 mm.

U. PROV. : Siwaliks (*M. Cameron*, Sept.) ; Jhajra Range (*C. F. C. Beeson*, Nov.).

Type in the British Museum.

260. **Onthophagus politus.**

Copris politus F.,* Ent. Syst., Suppl. 1798, p. 35.
Onthophagus politus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 217.

Black, very smooth and shining, with the elytra bright yellow, except the sutural interval and a broad, irregular, black, transverse band crossing it in the middle and curving forward

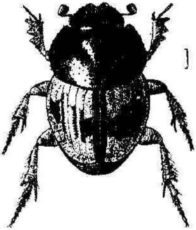

Fig. 39.—Onthophagus politus, ♂.

toward, but not reaching, the sides. The legs and the footstalk of the antenna are reddish and the club of the latter black. The head and pronotum have sometimes a slight greenish lustre.

Minute, broadly oval, compact and convex. The *head* is not very broad nor long, but is smooth and shining, with the sides gently rounded and the *clypeus* feebly and bluntly bilobed in front and bearing only a few punctures on each side. It is separated from the very smooth forehead by a short curved carina, and there is a straight carina upon the posterior part of the head. The *pronotum* bears fine scattered punctures, the front angles are blunt, the sides gently rounded in front and feebly sinuate behind, and the base is rather strongly rounded and finely margined, with a regular row of marginal

punctures. The *elytra* are rather strongly striate, the striæ minutely and rather sparingly punctured, the 7th stria gently curved, and the intervals very smooth, with scarcely perceptible puncturation. The *pygidium* is very smooth and shining, and has only a few scattered punctures. The *metasternum* bears scattered punctures, which are very few in the middle but rather more numerous at the sides.

♂. The inner apical angle of the front tibia is produced as a thin triangular lamina, which is bent downward.

Length, 3–3·5 mm. ; breadth, 2–2·5 mm.

BIHAR : Pusa (Feb.). BOMBAY : Belgaum (*H. E. Andrewes*). S. INDIA : Madura. CEYLON : Yala, S. Prov. (*T. Bainbrigge Fletcher*, Feb.).

Type in the Copenhagen Museum.

From dung of wild buffalo (*T. B. Fletcher*).

261. **Onthophagus bicolor.**

Onthophagus bicolor Raffr.,* Rev. Mag. Zool. 1877, p. 324 ; d'Orb., L'Abeille, xxix, 1900, p. 296.
Onthophagus martini d'Orb.,* Ann. Soc. Ent. France, 1897, p. 239.

Black, very smooth and shining, with the elytra bright yellow, except the sutural interval and sometimes a broad, irregular black crescent crossing the suture in the middle and curving forward without reaching the sides. The legs and the footstalk of the antenna are red, and the antennal club black.

Small, subglobose, compact, and convex, the *pronotum* with a few scattered punctures, the *elytra* with rather large and not at all closely set punctures in the striæ, and the intervals very smooth.

Length, 2·5–4 mm. ; breadth, 2–2·5 mm.

SIND : Karachi. ARABIA. ABYSSINIA. SUDAN. NIGERIA.

Type in the Paris Museum ; co-type in the British Museum ; type of *martini* in the Paris Museum.

This species agrees in all respects with *O. politus* F., except that the elytral striæ bear very much larger and more conspicuous punctures. It is also very frequently without the black crescent upon the elytra, which appears to be rarely absent in *O. politus*. The area of distribution is remote from that of the allied species, and extends only a little over the western boundary of our region.

Key to Group 23 (fasciatus *group*).

1 (12) **Sutural interval entirely dark.**
2 (7) **Base, apex, and sides of the elytra pale.**
3 (4) **Elytra with a narrow transverse black band** .... *fasciatus* Bouc., p. 311.

4 (3)	Elytra without a narrow transverse black band.	[p. 312.
5 (6)	Dark thoracic patch narrow in front ..	*expansicornis* Bates,
6 (5)	Dark thoracic patch broad in front ..	*dubernardi* Bouc.,
7 (2)	Base, apex, and sides of elytra not *entirely* pale.	[p. 313.
8 (11)	Pronotum with a sharp median tubercle.	
9 (10)	Elytra with a median black band and basal and apical spots	*comottoi* Lansb., p. 314.
10 (9)	Elytra dark, except at the base and apex	*favrei* Bouc., p. 315.
11 (8)	Pronotum without a median tubercle	*taurinus* White, p. 316.
12 (1)	Sutural interval not entirely dark.	
13 (16)	Punctures dark-stained; ♂, front legs not very long.	
14 (15)	Elytra very lightly striate; ♀, tubercles of the pronotum separated	[p. 317. *luridipennis* Boh.,
15 (14)	Elytra deeply striate; ♀, tubercles of the pronotum contiguous	*remotus* Bates, p. 318.
16 (13)	Punctures not dark-stained; ♂, front legs very long.	
17 (18)	Pronotum with a bituberculate anterior hump	*beesoni*, *sp. n.*, p. 319.
18 (17)	Pronotum with an arcuate anterior carina	*gracilipes* Bouc., p. 320.

262. **Onthophagus fasciatus.** (Plate I, fig. 7.)

Onthophagus fasciatus Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 231.

Bright yellow, with the head, the middle of the pronotum as far usually as the front and sometimes the hind margin (but leaving always pale lateral margins and sometimes a narrow pale median posterior line), the sutural margins of the elytra and an irregular transverse band touching the suture behind the middle, and the lateral margin before the middle (but leaving the epipleuræ pale), the greater part of the lower surface and the tibiæ, black; the pronotum strongly, and other parts feebly or not at all, suffused with a metallic green lustre. The antennæ, mouth-organs, and the greater part of the legs are yellow. The upper surface, with the exception of the head, is not very shining, and the upper and lower surface and the pygidium are very thinly clothed with yellow setæ.

Oval, deeply waisted, and very convex. The *head* is not very broad, the ocular lobes are gently rounded externally, and the *clypeus* is a little produced. The *pronotum* is fairly closely but not very finely punctured, the front angles are rather sharply produced, the lateral margins almost straight in front and sinuate behind, the hind angles very obtuse, and the base rounded. The *elytra* are rather deeply striate, the dorsal intervals feebly convex and finely but fairly numerously

punctured. The *pygidium* is rather strongly punctured, the metasternal shield very sparsely and minutely, and the sides of the *metasternum* not very strongly nor closely.

♂. The clypeus is feebly punctured in the middle and more strongly and closely at the sides, produced to a point, which is gently reflexed and divided by a slight curved carina from the sparsely punctured forehead. The posterior margin of the head is produced backward and gently curved upward, the median part forming a curved tongue-like process and the sides a pair of nearly parallel horns, broad at the base and tapering to the tips. The pronotum is almost vertical, and finely and sparsely punctured in front.

♀. The clypeus is transversely rugose, the sides are convergent, and the front margin is strongly reflexed and nearly straight in the middle, the forehead is fairly strongly punctured and separated from the clypeus by a strong, nearly straight carina, and there is a second strong carina upon the vertex. The pronotum bears a well-marked transverse carina in the middle just behind the front margin.

Length, 5–6·5 mm. : breadth, 3–4 mm.

U. PROV. : Dehra Dun (*M. Cameron*, Aug.). C. INDIA : Amarkantak, Umaria, Rewah State, 3200 ft. (*C. F. C. Beeson*, Nov.). BENGAL : Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May). BOMBAY : Belgaum (*H. E. Andrewes*). S. INDIA: Palni Hills (*P. S. Nathan*, May) : Sims Park, Coonoor (*F. H. Butcher*, June) ; Pollibetta, Coorg (*T. Bainbrigge Fletcher*, Nov.) ; Nilgiri Hills (*H. L. Andrewes*) ; Anaimalai Hills ; Shembaganur, Madura Dist.

Type in M. Boucomont's collection.

A specimen was found by Dr. Cameron in a fungus.

263. **Onthophagus expansicornis.**

Onthophagus expansicornis Bates, Entom. xiv, 1891, Suppl., p. 11.

Bright orange-red, moderately shining, with the head, a median patch upon the pronotum, usually dilating from front to hind margin, but sometimes occupying the whole pronotum except the lateral margins or the front angles, the sutural margins of the elytra, expanding in the middle into an oval patch, the lower surface, tibiæ, and tarsi dark, more or less suffused with a coppery or metallic greenish lustre. The antennæ and mouth-organs are yellow, and the upper surface is thinly clothed with minute yellowish setæ.

Broadly oval and convex. The *head* is not broad, the *clypeus* is a little produced, and the ocular lobes are not strongly rounded externally. The *pronotum* is rather closely and not very finely punctured, except in the middle of the front margin. The front angles are fairly sharp, the lateral margins almost

straight in front, gently sinuate behind, and the base is rounded. The *elytra* are finely striate, the intervals flat, fairly closely and not very minutely punctured. The *pygidium* is rather strongly punctured. The metasternal shield is finely and very sparsely punctured, and the sides of the *metasternum* a little more strongly and closely.

♂. The head is shining and rather scantily punctured, the clypeus with nearly straight sides, pointed and gently recurved in front, and not separated from the forehead, and the posterior part of the head is produced backward on each side as a pair of horns strongly curved outward, not united, but broadly and rather abruptly dilated inwardly at the base of each. The pronotum is broadly and shallowly hollowed and smooth in the middle of the anterior part.

♀. The clypeus is rugosely punctured, feebly rounded, but a little narrowed in front, separated by a short, nearly straight carina from the strongly punctured forehead, and there is a strong, straight, posterior carina. The front margin of the pronotum is narrow, but rather steep in the middle, with a short, straight, upper marginal carina.

Length, 6–7·5 mm. ; breadth, 4–4·5 mm.

U. Prov. : Dehra Dun (*C. F. C. Beeson*, July, Dec.) ; Dhauli Ganga, Almora, 9520 ft. (*R. N. Parker*, July) ; Kotgarh, Simla Hills, 7000 ft. (*S. N. Chatterjee*, Sept.) ; Mussoorie, 6000–7000 ft. (*Col. Harcourt*, Sept.).

Type in M. René Oberthür's collection.

264. **Onthophagus dubernardi.**

Onthophagus dubernardi Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 226.

Orange-yellow, with the head, the pronotum, except the lateral margins, and upon each elytron the sutural interval and longitudinal stripes not reaching the base or apex upon the 3rd, 5th, and 7th intervals, and sometimes one at the base of the last, black, these stripes often more or less united in the middle. The head and pronotum, and sometimes the elytra very feebly, are suffused with a coppery or metallic green lustre. A large part of the lower surface and of the tibiæ is also black. The upper surface bears an inconspicuous clothing of extremely minute pale setæ.

Broadly oval, very convex, moderately shining above. The *head* is closely punctured, not broad, the ocular lobes gently rounded and not much dilated in front of the eyes. The *pronotum* is closely and uniformly punctured. The front angles are sharp, the lateral margins feebly curved in front and sinuate behind, and the base is very feebly angulate in the middle. The *elytra* are finely striate, the dorsal intervals

flat and very finely irregularly punctured. The *pygidium* is moderately strongly and closely punctured, the metasternal shield bears only a few fine scattered punctures, and the sides of the *metasternum* are strongly but not closely punctured.

♂. The head bears large and small punctures intermixed, and the clypeus is not separated from the forehead; it is triangular in shape, with its apex rather blunt and strongly reflexed. The vertex is produced behind the eyes into a pair of horns, very broad at the base, where each bears a blunt inner tooth, then curving strongly outward and upward. The anterior part of the pronotum slopes rather abruptly, and is almost smooth.

♀. The clypeus is densely and rugosely punctured, feebly produced but broadly rounded in front and separated by a strong carina from the forehead, which has a similar carina between the eyes. The pronotum has a small double prominence just behind the front margin in the middle.

Length, 6–7 mm.; breadth, 3·5–4 mm.

SIKKIM: Gopaldhara, Rungbong Valley (*H. Stevens*). BURMA: Bhamo (*L. Fea*, June); Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.). TONKIN. INDO-CHINA.

Type in the Genoa Museum.

265. Onthophagus comottoi.

Onthophagus comottoi Lansb.,* Ann. Mus. Civ. Genova, xxii, 1885, p. 382.

Black and shining, with a greenish, bluish, or coppery lustre, the front angles of the prothorax, the elytra, except a black sutural line, a black spot just behind the middle of the base, a broad, irregular, transverse median band, and a transverse spot near the hind margin, bright yellow. The black spots may become united with the median band. The antennæ, mouth-organs, and a scanty clothing of minute setæ are also yellow, and the base and middle of the pygidium are sometimes of that colour. The tarsi are reddish.

Very broadly oval, compact and convex. The *head* is short and broad, with the margin evenly rounded at the sides, but nearly straight in the middle. The *pronotum* has an elevation in the middle and one on each side, and is finely and not closely punctured in front, more strongly and closely behind. The front angles are rather sharp, the sides straight in front and strongly bisinuate behind, and the base gently rounded. The *elytra* are finely striate, the 7th stria gently curved, and the dorsal intervals flat and sparsely punctured. The *pygidium* is very strongly and fairly closely punctured. The metasternal shield and the sides of the *metasternum* are rather strongly but fairly sparsely punctured.

♂. The clypeus is rather rugosely punctured but shining, and the forehead bears a slender horn arising between the eyes, *triangularly dilated at the base and directed backward.* The basal part of the pronotum is convex, longitudinally grooved in the middle, its front margin obtusely angular, and the sides *produced obliquely upward as sharp-edged* flanges, angular behind. The anterior part of the pronotum is flattened, very smooth and shining, with fine and sparse punctures.

♀. The clypeus is transversely rugose, separated from the sparsely punctured forehead by a curved carina, and there is a *second carina* between the eyes. The pronotum is very convex, with a lateral tubercle before the middle on each side and a median tubercle slightly in advance of these, and the surface *in front of the tubercles is sloping and rather more* sparingly punctured than the posterior part.

Length, 5·5–8 mm. ; breadth, 3·5–4·5 mm.

BURMA : Minhla (*Comotto*).

Type in the Genoa Museum.

266. **Onthophagus favrei.**

Onthophagus favrei Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 225.

Black or very dark brown, not very shining, with a slight metallic lustre, at least upon the head and pronotum, each elytron decorated with small orange marks at the base and apex, usually at the base of the 2nd, 3rd, 4th, 6th, and 7th intervals, and the extremity of the 2nd, 4th, and 6th (sometimes also upon the intervening ones). The pygidium, sides of the abdomen, femora, antennæ, and mouth-organs are also orange-coloured, and there is a clothing of minute *pale setæ above and beneath.*

Oval, deeply waisted, and moderately convex. The *head* is not very broad, the ocular lobes are gently rounded externally and not much dilated in front of the eyes. The *pronotum* is moderately finely and closely punctured and bears an anterior median pointed tubercle, in front of which it is smooth. The front angles are sharp, the lateral margins straight in front, sinuate behind, the hind angles well marked, and the base rounded. The *elytra* are finely striate, the dorsal intervals flat and minutely granulate. The *pygidium* is fairly strongly punctured, the metasternal shield finely and sparingly, and the sides of the *metasternum* strongly and moderately closely.

♂. The head is rather evenly, not very finely or closely, punctured, the clypeus produced to a point, which is strongly reflexed, the forehead not separated from the clypeus, and the

head behind the eyes produced backward, forming a pair of horns, rather broad in the basal part, which ends rather abruptly and is minutely toothed externally, tapering and almost parallel at the ends, which curve gently upward. The anterior tubercle of the pronotum is placed considerably behind the front margin, and the smooth anterior surface is flattened on each side. The front tibia is a little longer than that of the female.

♀. The clypeus is transversely rugose, its front margin broadly rounded; the forehead is well punctured, separated from the clypeus by a feebly curved carina, and with a straight carina behind. The median tubercle of the pronotum is placed close behind the front margin.

Length, 5–7·5 mm.; breadth, 3–4·5 mm.

BOMBAY: Belgaum (*H. E. Andrewes*); Ramanguli, N. Kanara (*B. M. Bhatia*, Nov.). S. INDIA: Nilgiri Hills (*H. L. Andrewes*); Coimbatore (Feb.); Bangalore (*C. F. C. Beeson*, Aug.). CEYLON: Kandy (*G. E. Bryant*, June, July); Dikoya, 3800–4200 ft. (*G. Lewis*, Dec., Jan., Feb.); Maskeliya (*E. E. Green*, Mar., Aug.); Peradeniya (*E. E. Green*, Dec.); Battaramulla, W. Prov. (*G. M. Henry*, Mar.); Homagama, W. Prov. (*G. M. Henry*, Mar.); Colombo (*G. M. Henry*, Aug.).

Type in the Genoa Museum; co-type in M. Boucomont's collection.

Dr. Beeson found specimens in a dead lizard.

267. **Onthophagus taurinus.**

Onthophagus taurinus White,* Ann. Mag. Nat. Hist. xiv, 1844, p. 424; Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 225.

Black, not very shining above, with the head and pronotum dark coppery or metallic, the latter with the front angles and occasionally the lateral margins and part or the whole of the front and hind margins yellow, each elytron also decorated with small orange patches at the base of the intervals from the 2nd to the 7th (the 5th sometimes excepted), and frequently also at the extremities of the 2nd, 4th, and 6th. These basal and apical patches are sometimes united upon the alternate intervals, forming pale longitudinal stripes. The exterior parts of the pygidium and femora and much of the lower surface of the body are also yellow, as well as the antennæ, mouth-parts, and hairy clothing, which is minute but fairly close above.

Oval, compact, and convex. The *head* is not broad, the sides are rounded, and the *clypeus* is a little produced. The *pronotum* is finely and closely punctured, with two slight tubercles, placed a short distance apart a little behind the front margin, and a short, feeble, longitudinal groove at the

base. The front angles are rather sharp, the sides nearly straight in front and behind, and the base is strongly rounded. The *elytra* are finely striate, the intervals flat, minutely and fairly closely punctured. The *pygidium* is fairly strongly and closely punctured, the metasternal shield rather finely and fairly evenly, and the sides of the *metasternum* strongly and more closely.

♂. The head is shining, finely and unevenly punctured, without carinæ, the clypeus bluntly pointed and strongly reflexed in front, and the vertex armed with two backwardly produced, strongly divergent horns, flat at the base, strongly curving upward and sharply pointed at the ends. The pronotum is flattened, sloping, shining, and very lightly punctured in front. The front tibia is a little elongate.

♀. The clypeus is finely rugose, narrowly rounded in front, and separated by a strong straight carina from the punctured forehead. There is a similar carina behind the eyes.

Length, 6–7 mm. ; breadth, 4–4·5 mm.

BENGAL : Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May). BURMA : Bhamo (*L. Fea*, June) ; Teinzo (*L. Fea*, May) ; Tavoy (*W. Doherty*). SIAM. FORMOSA. S. CHINA.

Type in the British Museum.

268. **Onthophagus luridipennis.**

Onthophagus luridipennis Boh.,* Eugenies Resa, 1858, p. 45.
Onthophagus fuscopunctulatus Bouc., Ann. Soc. Ent. France, lxxxiii, 1914, pp. 292, 293 (now syn.).
Onthophagus fuscopunctatus Lansb. (not Fab.), Notes Leyd. Mus. v, 1883, p. 48.

Brownish-yellow, with the head, the pronotum except the margins and a median longitudinal line at the base, the elytral striæ and punctures and parts of the lower surface, dark, the head and pronotum suffused with metallic lustre. The dark colour may extend over the whole of the pronotum, except the front angles, and the elytra may be more or less dark except at the base and sutural margin. The upper surface is not very shining, and is scantily clothed with minute pale setæ.

Broadly oval and convex. The *head* is closely punctured and not very broad. The *pronotum* is closely and evenly, not very finely, punctured. The front angles are fairly sharp, the sides gently rounded in front and feebly sinuate behind, the base rounded and very bluntly angulate in the middle. The *elytra* are finely striate, the intervals flat and finely and fairly closely punctured. The *pygidium* is rather strongly punctured. The *metasternum* is very finely punctured in the middle and rather strongly at the sides.

♂. The head is flat, without carinæ, a little produced, pointed and reflexed in front. The head behind the eyes is produced backward into a pair of flat, widely separated and divergent horns, strongly curved and fitting closely against the pronotum. The pronotum is extremely convex, with its anterior part rather smooth, flat, and sloping.

♂ (minor). The horns are short, and the pronotum bears a pair of prominent tubercles, separated by a depression, at the top of the declivity.

♀. The clypeus is finely rugose, slightly narrowed but rounded in front, and separated by a straight, rather strong carina from the punctured and hollowed forehead. There is another straight carina between the eyes. The pronotum bears two blunt tubercles closely contiguous immediately behind the front margin.

Length, 5–7 mm. ; breadth, 3–4 mm.

U. PROV. : Dehra Dun (*S. N. Chatterjee*, Nov.). BENGAL : Rangpur (*M. O. T. Iyengar* Nov.) ; Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May). ASSAM : Haflong, Cachar Dist. (*C. F. C. Beeson*, May). BURMA : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.) ; Asciuii Ghecu, 3600–4500 ft. (*L. Fea*, Mar., April) ; Maymyo (*H. L. Andrewes*). INDO-CHINA. SUMATRA. JAVA. PHILIPPINE IS. S. CHINA.

Type in the Stockholm Museum.

269. Onthophagus remotus.

Onthophagus remotus Har.,* Col. Hefte, xvi, 1879, p. 226 ; Bouc., Bull. Soc. Ent. France, 1924, p. 211.

Yellow, with a golden or coppery suffusion, the head and the middle of the pronotum dark, but the dark area of the latter sometimes reduced to an anterior and two posterior patches. The elytral striæ and punctures are also dark, and the dark pigment may spread and form a dark median area upon each elytron. The tibiæ, tarsi, the sutures of the lower surface and the middle of the metasternum are also usually brown or reddish. The antennæ are yellow. The upper surface is clothed with very minute pale setæ.

Oval and moderately convex. The *head* is not very broad, but the sides are strongly rounded and the *clypeus* is more or less produced. The *pronotum* is rather finely and evenly and fairly closely punctured, and has two blunt tubercles placed close together a little behind the front margin. The front angles are acute, the sides straight in front, feebly sinuate behind, and the base is obtusely angular in the middle. The *elytra* are finely striate, the striæ fairly closely punctured, and the intervals finely and not very sparsely punctured. The *pygidium* is fairly finely and closely punctured, the

metasternal shield finely and sparsely, and the sides of the *metasternum* rather more strongly.

♂. The head is moderately finely and closely punctured, the clypeus produced to a blunt point and curving upward in front, and the posterior part of the head produced backward on each side as a pair of unconnected horns, flattened and moderately broad at the base, where they are divergent, slender and curving together at the tips. The pronotum is smooth and shining in front, a little hollowed on each side behind the cephalic horns, with the median prominence slightly bicuspid in front.

♂ (minor). The cephalic horns may be represented only by a slight pointed prominence on each side of the hind margin of the head, and the thoracic prominence only by a pair of tubercles, as in the female.

♀. The clypeus is finely rugose in front, and has a broadly rounded anterior margin. It is separated by a straight carina from the forehead, and there is a second straight carina between the eyes. There is a short and feebly bicuspid transverse ridge immediately behind the middle of the front margin of the pronotum.

Length, 6·5 mm.; breadth, 4–5·5 mm.

BURMA. TENASSERIM: Tavoy (*W. Doherty*).

Type in M. René Oberthür's collection.

270. **Onthophagus beesoni**, sp. n. (Plate I, fig. 3.)

Testaceous yellow, with the head, a large median patch upon the pronotum, usually reaching the front and hind margins but leaving a small pale spot in the middle of the latter, an irregular transverse band crossing the middle of the elytra and sometimes broken into several irregular patches, the tibiæ, tarsi, and usually the middle of the sternum, and the abdominal sutures, dark coppery.

Oval, very convex, rather shining, with a thin and inconspicuous clothing of pale setæ upon the upper surface. The *head* is fairly strongly and evenly punctured, not very wide, the ocular lobes not strongly dilated. The *pronotum* is very convex, rather strongly and closely punctured. The front angles are fairly sharp, the lateral margins are gently rounded in front, gently sinuate behind, the hind angles are distinct but obtuse, and the base is rounded, with an obtuse angle in the middle. The *elytra* are finely striate and the dorsal intervals are flat and finely and rather numerously punctured. The *pygidium* is moderately punctured, the metasternal shield finely and unevenly, and the sides of the *metasternum* strongly but not closely.

♂. The head is flat, without carinæ, the front margin of tne

clypeus is nearly straight, strongly reflexed, and produced into a short rounded process in the middle. There is a pair of slight tubercles placed rather far apart between the eyes. The anterior part of the pronotum is broadly elevated in the middle and produced into a slight tubercle on each side. The surface between the elevation and the front angle may be a little hollowed and smooth. The front legs are elongate, the tibia very long and slender, with its external teeth short and far apart, and the terminal spine long, stout, and abruptly bent at the end.

♀. The clypeus is feebly rounded in front, nearly straight at the sides, and separated by a strong, nearly straight carina from the forehead, and there is a short, straight, posterior carina between the eyes. The front tibia is broad and strongly curved.

Length, 7–8·5 mm.; breadth, 4 mm.

U. Prov.: Haldwani, Kumaon Div. (*H. G. Champion*); Jhajra Range, Dehra Dun (*C. F. C. Beeson*, Nov.; *J. C. M. Gardner*, Feb.). Bengal: Buxar Duars (*D. Nowrojee*, May).

Type in the British Museum.

This is a peculiar species, resembling *O. gracilipes* Bouc., but remarkable for the strongly elevated prothorax in the male. The elytra are less closely punctured and more shining than those of that species.

271. Onthophagus gracilipes.

Onthophagus gracilipes Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 219.

Bright testaceous yellow, with the head metallic greenish-black or coppery, the pronotum of the same colour, with the exception of the front and lateral margins, and sometimes a median longitudinal stripe, and the elytra with a broad, irregular, transverse band, leaving a broad anterior and narrow posterior margin, and sometimes extending from side to side, sometimes breaking up into longitudinal bars externally. The tibiæ and parts of the lower surface are also dark and more or less metallic. The upper surface bears very minute and inconspicuous pale setæ.

Oval, very convex, and moderately shining above. The *head* is not broad, dilating little in front of the eyes, and the *clypeus* has rather straight and convergent sides and truncate front margin. The *pronotum* is rather strongly and closely punctured, with acute front angles, the sides nearly straight in front and feebly sinuate behind, the hind angles very obtuse, the base very obtusely angulate in the middle. The *elytra* are moderately strongly striate, and the dorsal intervals are slightly convex, not very finely and fairly closely punctured.

The *pygidium* is rather strongly punctured and not very shining, and the *metasternum* is sparingly punctured in the middle and at the sides, the last rather more strongly.

♂. The head is very shining, very finely and sparsely punctured in the middle, and a little more strongly at the sides, its front margin straight, strongly reflexed, and a little produced upward in the middle, the clypeus not separated from the forehead, the vertex bearing between the eyes a strongly elevated transverse lamina, narrowing a little to the summit, where it is feebly bilobed. The pronotum is very convex, with its front margin vertical in the middle. The front tibia is very long and slender, with very short teeth, its terminal spur very long and stout, hooked and blunt at the tip.

♀. The clypeus is rugosely punctured, separated by a long, straight, well-elevated carina from the forehead, which is strongly punctured, and there is a second straight but shorter carina between the eyes. The pronotum bears a short curved carina just behind the front margin. The front tibia is short and stout.

Length, 6–7·5 mm. ; breadth, 4–4·5 mm.

BURMA : Cheba, Karen Hills, 1500–3000 ft. (*L. Fea*, Dec.) ; Maymyo (*H. L. Andrewes*). INDO-CHINA.

Type in the Genoa Museum.

Key to Group 24 (pusillus *group*).

1	(10)	Pronotum closely punctured.	
2	(7)	Clypeus truncate or excised in front.	
3	(4)	Head granular	*pusillus* F., p. 321.
4	(3)	Head punctured.	[p. 322.
5	(6)	Elongate, not very small	*truncaticornis* Schall.,
6	(5)	Short, small	*iyengari*, sp. n., p. 323.
7	(2)	Clypeus produced or rounded in front.	
8	(9)	Clypeus produced, sides of head strongly rounded	*andrewesi*, sp. n., p. 324.
9	(8)	Clypeus not produced, sides of head feebly rounded	*porcus*, sp. n., p. 325.
10	(1)	Pronotum not closely punctured.	
11	(12)	Pronotum with anterior carina ; ♂ horned	*socialis*, sp. n., p. 325.
12	(11)	Pronotum without anterior carina ; ♂ not horned	*purpurascens* Bouc., [p. 326.

272. Onthophagus pusillus.

Copris pusillus F.,* Ent. Syst., Suppl. 1798, p. 36.
Onthophagus pusillus Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 216.
Onthcphagus myrmidon Jek., Rev. Mag. Zool. 1872, p. 415.

Black and shining beneath, very dark chocolate-brown and opaque above, except the head and the anterior margin of the pronotum, which are coppery. The antennæ are dark, and

the upper surface is rather closely clothed with very minute grey setæ.

Rather narrowly oval and not very convex. The *head* is short but not very broad, rather evenly but not closely granular, with the sides and anterior margin evenly rounded, the *clypeus* separated by a curved carina from the forehead, which is limited behind by a straight carina between the eyes. The *pronotum* is finely and closely punctured, the punctures a little larger and less close at the sides. The front angles are blunt, the margins feebly rounded in front, slightly sinuate behind, the base feebly angular in the middle. The *elytra* are finely striate, the 7th stria distinctly curved, the intervals flat and bearing minute and not very numerous granules. The *pygidium* is without a basal ridge, and bears rather large and close punctures, and the *metasternum* has fine scattered punctures.

The two sexes are alike.

Length, 3·5–4·5 mm. : breadth, 2·5–3 mm.

CEYLON : Colombo (*G. M. Henry*, Aug., Sept., Jan. ; *H. P. Green*, April) ; Battaramulla, W. Prov. (*G. M. Henry*, March) ; Galle (*G. Lewis*) ; Mt. Lavinia (*G. E. Bryant*, May).

Type in the Copenhagen Museum.

Many specimens were found by Mr. Henry in a dung-ball of *Scarabæus gangeticus*.

273. Onthophagus truncaticornis.

Scarabæus truncaticornis Schall., Abh. Hall. Nat. Ges. i, 1783, p. 238.

Onthophagus forcipatus Har., Col. Hefte, xi, 1873, p. 103 (new syn.).

Very dark coppery- or greenish-black, not very shining, except upon the head, the front of the pronotum, and the lower surface, fairly closely clothed above with short reddish setæ, the antennæ dark.

Broadly oval, compact, and very convex. The *head* is moderately broad, with the clypeal margin strongly reflexed and feebly excised in front, and the sides rather strongly rounded. The *pronotum* is coarsely and closely umbilicate-punctate, with the front margin smooth, shining, and nearly vertical in the middle, the front angles blunt, the lateral margins straight in front and sinuate behind, and the base well rounded. The *elytra* are broadly and shallowly striate, with the intervals flat and bearing numerous fine granules, partly in double rows. The *pygidium* is rather strongly and closely punctured. The *metasternum* bears scattered punctures in the middle and at the sides.

♂. The clypeus is very shining, with scattered punctures, separated from the smooth forehead by a feeble rounded

carina, and the vertex is produced backward as a nearly semicircular plate, which curves upward and rises to a short erect horn, bifurcate at the tip. The pronotum is very convex, its vertical front margin broad, with its upper edge nearly straight.

♀. The clypeus is rather rugosely punctured and not shining, separated from the smooth forehead by a strong curved carina, and the vertex bears a very strong straight carina. The smooth vertical front margin of the pronotum is narrower than in the male, and its upper edge bears four slight tubercles, the inner pair close together.

Length, 6·5–8 mm.; breadth, 4 mm.

BOMBAY: Belgaum (*H. E. Andrewes*); Dharwar. S. INDIA: Mangalore, S. Kanara (*T. R. D. Bell*); Nilgiri Hills (*H. L. Andrewes, A. K. W. Downing*).

Type lost, that of *forcipatus* in M. René Oberthür's collection.

In the Nilgiri Hills occurs a variety with the pronotum rather more finely and densely punctured.

Schaller carefully described two forms, which I have no doubt are the two sexes of this species. In MM. Boucomont and Gillet's Catalogue *O. forcipatus* Har. stands as a synonym of *O. negligens* Walk., but the two types were compared by me some years ago and Harold's found to belong to a larger species with differently sculptured pronotum. The two forms have also a different range.

274. **Onthophagus iyengari**, sp. n.

Black, scarcely shining above, with the head usually more or less coppery, the antennæ, mouth-organs and tarsi red, and the upper surface rather closely clothed with very short greyish setæ.

Short, broad, and very convex. The *head* is shining, strongly but rather sparingly punctured, not broad, with the sides rounded and the *clypeus* a little produced and truncate or feebly sinuate in the middle, and divided by a short curved carina from the forehead. The *pronotum* is finely, closely and evenly punctured, except at the front margin, which is smoother, with a slight depression or two slight tubercles in the middle. The front angles are prominent but blunt, the sides nearly straight in front and feebly sinuate behind, and the base strongly rounded. The *elytra* are lightly striate, and the intervals flat with minute but fairly numerous granules. The *pygidium* is shining, without a basal ridge, and fairly closely and strongly punctured. The sides and middle of the *metasternum* are fairly strongly and evenly but not closely punctured.

♂. The head is more sparingly punctured that that of the

female, and the clypeus a little more produced. The posterior part of the head is produced backward as a triangular plate, the apex of which forms a short upward-curving horn. The pronotum has a slight depression behind the cephalic process.

♀. The head has a slight posterior carina in addition to the clypeal carina, and the pronotum has usually two slight anterior tubercles.

Length, 5–5·5 mm.; breadth, 3 mm.

Bengal: Rangpur (*M. O. T. Iyengar*, Nov.).

Type in the British Museum.

275. **Onthophagus andrewesi**, sp. n.

Bronzy-black, scarcely shining except upon the head and the front of the pronotum, with the elytra brownish-black, the antennæ and mouth-organs red, and the upper surface fairly closely clothed with short greyish setæ.

Oval and convex. The *head* is moderately broad, strongly rounded at the sides, and produced in front. The *pronotum* is strongly and closely punctured. The front angles are blunt, the sides straight in front and feebly sinuate behind, the hind angles very obtuse, and the base strongly rounded. The *elytra* are finely striate, and the intervals are flat and minutely granulate. The *pygidium* is without a basal ridge and strongly but not very closely punctured. The metasternal shield bears scattered punctures, and the sides of the *metasternum* are fairly strongly but not closely punctured.

♂. The head bears fairly strong but not very numerous punctures, the clypeus is produced to a blunt point and separated by a slight rounded carina from the forehead, and the posterior margin of the head is produced backward as a broad plate, of which the two angles are drawn out as short recurved horns with a rounded sharp edge between them. The pronotum is smooth at the front edge and has a slight depression on each side behind the cephalic horns, and a rounded prominence between them.

♀. The clypeus is feebly produced, very coarsely rugosely punctured, separated by a strong curved carina from the forehead, and there is a stronger posterior carina.

Length, 6–7 mm.; breadth, 3·5 mm.

S. India: Nilgiri Hills (*H. L. Andrewes*); Kanara (*T. R. D. Bell*); Anaimalai Hills, 2400 ft. (*J. C. M. Gardner*, May).

Type in the British Museum.

In the specimens from the Anaimalai Hills the males have a short, quadrate, median process between the two horns.

276. **Onthophagus porcus**, sp. n.

Black, not shining, with the head sometimes feebly metallic, the tarsi and antennæ deep red, and the surface of the body above and beneath rather closely clothed with fine grey hairs.

Oval, compact, and very convex. The *head* is narrow, shining, its front margin is rounded, strongly reflexed and scarcely or not at all produced, and the sides are very gently curved. The *pronotum* is finely, evenly, and closely punctured, the front angles are fairly sharp, the sides feebly rounded in front and nearly straight behind, and the base strongly rounded. The front margin of the thorax is narrowly vertical, and more strongly and sparingly punctured. The *elytra* are very finely striate, the intervals not quite flat, and finely and fairly closely granular. The *pygidium* is moderately finely and closely punctured, the metasternal shield bears a few scattered punctures, and the sides of the *metasternum* are rather more numerously punctured.

♂. The head is finely and sparsely punctured, the clypeus is a little longer than that of the female and not separated from the forehead, and the posterior margin of the head bears a short, erect, sharp-pointed horn in the middle. The pronotum is very highly convex.

♀. The head is fairly strongly punctured, the clypeus is separated from the forehead by a rounded carina, and there is a strongly elevated short and straight carina between the eyes. The front tibiæ are very broad.

Length, 5–6·5 mm.; breadth, 3–3·5 mm.

BENGAL: Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May).

Type in the British Museum.

This species is very closely similar to *O. andrewesi*, but *the male bears only a single short horn upon the head, instead* of a pair. In addition, the clypeus is rounded and not distinctly produced, the sides of the head are very gently rounded, and the granules upon the elytral intervals are not as fine as those of *O. andrewesi*.

277. **Onthophagus socialis**, sp. n.

Black and shining, usually with a faint coppery suffusion upon the head and pronotum, occasionally extending also to the elytra, the antennal club pale yellow, and the upper surface thinly clothed with very fine grey setæ.

Broadly oval and convex, rather deeply waisted. The *head* is broad, strongly rounded at the sides, with the *clypeus* rounded and entire in front and separated by a strong, nearly straight carina from the smooth, almost unpunctured

forehead. The *pronotum* is very strongly and fairly closely punctured, and has a strong transverse prominence behind the front margin and a well-marked longitudinal groove upon the posterior half. The front angles are blunt, the sides nearly straight in front and a little sinuate behind, and the base strongly rounded. The *elytra* are deeply striate, the intervals slightly convex and not very finely nor closely punctured. The *pygidium* is rather strongly punctured and without a basal carina. The *metasternum* bears fairly large, scattered punctures, except at the sides, where they are moderately close.

♂. The clypeus is sparsely punctured and the forehead bears a pair of short, erect, parallel horns. The pronotum is vertical in front, and the margin of the declivity forms a slightly rounded prominence.

♀. The clypeus is rugose and the forehead bears a straight carina between the eyes, sometimes a little elevated at each end and in the middle. The pronotum is vertical in front, and the margin of the declivity forms a double prominence.

Length, 6–7 mm.; breadth, 3·5–4 mm.

BOMBAY: Tavargatti, Belgaum Dist. (*B. M. Bhatia*, Oct.). S. INDIA: Nilgiri Hills (*H. L. Andrewes*); Fraserpet, Coorg (June).

Type in the British Museum.

Mr. Andrewes found this species in abundance.

278. **Onthophagus purpurascens.**

Onthophagus purpurascens Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 215.

Black or deep brownish-black, not very shining, with the head and the anterior part of the pronotum feebly coppery, the antennæ yellow, the mouth-parts and legs red, and the outer margins of the elytra usually vaguely purplish-brown. The upper surface is entirely but not densely clothed with minute pale setæ.

Elongate-oval and moderately convex. The *head* is short and broad, strongly dilated in front of the eyes, with the *clypeus* evenly rounded and separated by a rounded carina from the strongly punctured forehead. The *pronotum* is evenly, not very closely, punctured, strongly at the sides and less strongly in the middle. The front angles are fairly sharp, the lateral margins nearly straight in front and sinuate behind, and the base rounded. The *elytra* are finely striate, the dorsal intervals flat and not very finely punctured. The *pygidium* is without a basal ridge, very shining and fairly strongly but not closely punctured. The metasternal shield is extremely smooth, with a few punctures in front only, and the sides of the *metasternum* bear only a few scattered punctures.

♂. The clypeus is rugosely punctured and the head bears a well-marked straight posterior carina.

♀. The clypeus is closely rugose and the posterior carina is indistinct.

Length, 5–6·5 mm. ; breadth, 3–4 mm.

BURMA : Shwegu-Myo (*L. Fea*, Oct.) ; Toungoo (*L. Fea*, May). INDO-CHINA.

Type in the Genoa Museum.

The two sexes of this species are almost alike.

Key to Group 25 (mopsus *group*).

1 (30) Pronotum evenly and uniformly punctured.
2 (11) Pronotum finely and closely punctured.
3 (10) Head not two-horned.
4 (9) Head horned or ridged.
5 (6) Pronotum without an oblique basal impression on each side, with two widely separated tubercles in ♂ ... *mopsus* F., p. 328.
6 (5) Pronotum with a faint oblique basal impression on each side, without widely separated tubercles in ♂.
7 (8) Pronotum with anterior hollow, tubercles or prominence .... *turbatus* Walk., p. 329.
8 (7) Pronotum without anterior hollow, tubercles or prominence .... *hastifer* Lansb., p. 330.
9 (4) Head flat, uniformly sculptured ..... *deflexicollis* Lansb., [p. 331.
10 (3) Head two-horned in both sexes...... *agaricophilus*, sp. n.,
11 (2) Pronotum not finely and closely punctured. [p. 333.
12 (13) Uniformly dark above .... *ensifer* Bouc., p. 334.
13 (12) Not uniformly dark above.
14 (17) Elytra opaque. [p. 335.
15 (16) Intervals of the elytra well punctured. *phanaeiformis* Bouc.,
16 (15) Intervals of the elytra bearing minute granules .... *frugivorus*, sp. n., [p. 336.
17 (14) Elytra shining.
18 (25) Elytra decorated with a transverse black band.
19 (24) Thoracic elevation not longitudinally impressed.
20 (21) Middle process of pronotum divided.. *carinensis* Bouc., p. 337.
21 (20) Middle process of pronotum not divided.
22 (23) Pygidium with a pale median stripe.. *dichropygus* Gill., p. 338.
23 (22) Pygidium without a pale median stripe .... *bifasciatus* F., p. 339.
24 (19) Thoracic elevation longitudinally impressed .... *unifasciatus* F., p. 341.
25 (18) Elytra without a transverse black band. [p. 342.
26 (27) Clypeus not notched or lobed .... *nagpurensis*, sp. n.,
27 (26) Clypeus notched or lobed.
28 (29) Elytra pale ; ♂ with a short erect horn on the head .... *centricornis* F., p. 343.

29 (28) Elytra dark, with the shoulder red ; ♂ with the head produced in front and behind	*vaulogeri* Bouc., p. 344.
30 (1) Pronotum unequally and unevenly punctured.	
31 (36) Pygidium and lower surface entirely dark.	
32 (35) Body short and broad.	[p. 345.
33 (34) Elytra with a black bar in the middle.	*malabarensis* Bouc.,
34 (33) Elytra with a black bar behind the middle	*ludio* Bouc., p. 346.
35 (32) Body rather elongate	*nitidulus* Klug, p. 348.
36 (31) Pygidium and lower surface more or less pale.	
37 (42) Pronotum with a broad anterior prominence or none.	
38 (39) Pronotum rather less closely punctured ; ♂, clypeus not pointed.....	*cervus* F., p. 348.
39 (38) Pronotum rather more closely punctured ; ♂, clypeus pointed.	
40 (41) Head of the ♂ two-horned, that of the ♀ feebly sinuate at front margin	*falsus* Gill., p. 350.
41 (40) Head of the ♂ three-horned, that of the ♀ not sinuate at front margin	*proletarius* Har., p. 352.
42 (37) Pronotum with a sharp anterior prominence	*duporti* Bouc., p. 353.

279. Onthophagus mopsus.

Scarabæus mopsus F.,* Ent. Syst. i, 1792, p. 58.
Copris mopsus F., Syst. Eleut. i, 1801, p. 49.
Copris gracilicornis Germ., Germar's Mag. Ent. i, 1813, p. 114 (new syn.).
Onthophagus gracilicornis Bouc., Ann. Mus. Civ. Genova, xlvi, 1914, p. 220.

Bronzy or blackish-brown, with a slight metallic green lustre, but not very shining, clothed fairly closely above with very minute greyish setæ.

Oval, compact, not very convex. The *head* is rather broad, with the *clypeus* rugosely punctured, its front margin evenly rounded and strongly reflexed. The *pronotum* is finely and closely punctured, scarcely impressed at the base on each side. The front angles are fairly sharp, the sides nearly straight in front and feebly sinuate behind, and the base gently rounded. The elytra are finely striate, with the intervals flat, the dorsal intervals minutely granulate, and the lateral ones fairly closely punctured. The *pygidium* is moderately strongly punctured, and the *metasternum* is sparsely punctured in the middle and a little more closely at the sides.

♂ (long-horned phase, *gracilicornis* Germ.). The head bears an extremely long and slender thread-like horn, arising in front of the eyes and curving backward, sometimes extending beyond the hinder margin of the pronotum. The anterior

part of the pronotum is smooth and unpunctured and a little flattened in the middle, with a strong tubercle on each side a little behind the front margin, the two tubercles nearly equidistant from each other and from the outer margins.

♂ (short-horned phase, *mopsus* F.). The clypeus is divided from the forehead by a curved carina, and between the eyes arises a very short, erect, conical horn or tubercle. The smooth anterior margin of the pronotum is vertical, and there is a short straight carina in the middle of its upper edge. *This is occasionally divided into two slightly oblique carinæ.*

♀. The clypeus is divided from the forehead by a curved carina, and there is a straight carina between the eyes. The smooth anterior margin of the pronotum is vertical, and there is a short straight carina in the middle of its upper edge.

Length, 6–8 mm. ; breadth, 4–5 mm.

SIND : Karachi (*T. R. D. Bell*). KASHMIR : Harwan, Pohru Valley, 6000 ft. (*B. M. Bhatia*, May) ; Haran, Sindh Valley, 5500 ft. (*C. F. C. Beeson*, June) ; Batote, Udhampur Div., 5500 ft. (*C. F. C. Beeson*, May). U. PROV. : Fyzabad (*W. H. G. Hingston*) ; Jhajra, Dehra Dun (*Sher Bahadur*, Feb.). BIHAR : Pusa (*A. Murtaza*, Feb. to Aug.). BENGAL : Calcutta (*D. Ribbe*) ; Berhampore (*E. T. Atkinson*) ; Darjeeling (*Dr. Pearson*).

Type in the Hope Dept., Oxford University Museum.

280. **Onthophagus turbatus.**

Onthophagus turbatus Walk.,* Ann. Mag. Nat. Hist. (3) ii, 1858, p. 209.

Bronzy or blackish-brown, with a slight metallic green lustre above, occasionally with an undefined orange patch at the base of each elytron near the shoulder. The antennæ and mouth-organs are yellow, and the upper surface is fairly closely clothed with minute greyish setæ.

Oval, compact, not very convex. The *head* is rather broad, with the *clypeus* rugose, its front margin rounded. The forehead is sparingly punctured and divided from the clypeus by a curved carina. The *pronotum* is finely and closely punctured, with a well-marked, short, oblique, feebly punctured impression close to the base on each side. The front angles are fairly sharp, the lateral margins nearly straight in front and feebly sinuate behind, and the base is gently rounded. The *elytra* are finely striate, with the intervals flat, the dorsal intervals minutely granulate, and the lateral ones fairly closely punctured. The *pygidium* is moderately punctured and the *metasternum* sparingly, both in the middle and at the sides.

♂ (long-horned phase). There is a nearly erect horn arising between the eyes, moderately broad at the base, evenly tapering,

curving gently backward, and slender at the end. The pronotum is transversely hollowed, smooth and shining in front.

♂ (short-horned phase). The head bears a short, transverse, erect, truncate horn between the eyes. The front margin of the pronotum is vertical in the middle, the upper edge of the declivity forming a slight prominence in the middle.

♀. There is a strong transverse carina between the eyes. The front margin of the pronotum is vertical in the middle, and the upper edge of the declivity forms a slight double prominence in the middle.

Length, 7–8 mm. ; breadth, 4–5 mm.

Bombay : Poona (*E. T. Atkinson*) ; Belgaum (*H. E. Andrewes*) ; Kanara (*T. R. D. Bell*). S. India : Nilgiri Hills (*H. L. Andrewes*) ; Genji, Coromandel (*M. Maindron*, Aug., Sept.); Mahé, Malabar (*M. Maindron*) ; Pondicherry. Ceylon : Kandy, 1500–1700 ft. (*G. Lewis*, Feb.) ; Balangoda (*G. Lewis*, April) ; Peradeniya (*E. E. Green*, Mar., April) ; Kotte, W. Prov. (*G. M. Henry*, Mar.).

Type in the British Museum.

M. Boucomont is not correct in recording this species from Tonkin and Annam.

This is the southern representative of *O. mopsus* F., to which it is very closely related, and, like it, has two forms of male, the short-horned phase showing the thoracic protuberance of the female. The long-horned phase has a less slender and generally much shorter horn than *O. mopsus*. The thoracic depression is more definite and without the tubercle on each side present in *O. mopsus*. The females are closely similar, but the thoracic prominence of *O. turbatus* is double. The oblique impression near the base of the pronotum on each side is distinctive of this species. The orange shoulder-spot is not always apparent.

281. **Onthophagus hastifer.**

Onthophagus hastifer Lansb.,* Ann. Mus. Civ. Genova, (2) ii, 1885, p. 380 ; Bouc., op cit. xlvi, 1914, p. 221.
Onthophagus turmalis Gill.,* Ann. Soc. Sci. Brux. xliv, 1924, p. 66 (new syn.).

Bronzy or reddish-brown, with a slight metallic lustre above, not very shining, each elytron with a transverse orange basal patch between shoulder and suture. The posterior margins of the elytra and the pygidium are usually orange also. The antennæ and mouth-organs are yellow, and the upper surface is fairly closely clothed with minute greyish setæ.

Oval, compact, not very convex. The *head* is rather broad, with the clypeus rugose, and its front margin rounded. The

clypeus is divided from the forehead by a curved carina. The *pronotum* is finely, closely, and uniformly punctured, without prominence or smooth anterior area, the oblique basal impression very feeble and not smooth. The front angles are rather sharp, the lateral margins nearly straight in front and feebly sinuate behind, and the base rounded. The *elytra* are finely striate, the intervals flat, the dorsal intervals minutely granulate, and the lateral ones fairly closely punctured. The *pygidium* is fairly strongly punctured, and the *metasternum* sparingly in the middle and at the sides.

♂ (long-horned phase). The head bears an extremely long and slender thread-like horn, arising between the eyes and curving backward, sometimes extending beyond the hind margin of the pronotum.

♂ (short-horned phase). The head bears a very short transverse tubercle between the eyes.

♀. The head bears a transverse carina between the eyes.

Length, 6–7 mm.; breadth, 4–5 mm.

BURMA: Rangoon (*L. Fea*, May); Bhamo (*L. Fea*, June); near Mandalay (*L. Fea*, May); Minhla (*Comotto*). S. CHINA. FORMOSA.

Type in the Genoa Museum; that of *turmalis* Gill. in Dr. Gillet's collection.

O. hastifer Lansb. closely resembles *O. mopsus* and *O. turbatus*, but the pronotum is evenly punctured everywhere in both sexes, without smooth area or lateral tubercles in the male or anterior prominence in the female. The yellow basal patch upon the elytra, although variable, is nearly always present.

282. **Onthophagus deflexicollis.**

Onthophagus deflexicollis Lansb., Notes Leyd. Mus. v, 1883, p. 72; Bouc., Faune Ent. de l'Indoch. iv, 1921, pp. 59, 60.
Onthophagus mutabilis Lansb., l. c.

Shining chocolate-brown or brownish-black, with a faint metallic lustre upon the head and prothorax and each elytron decorated with an orange spot upon the shoulder (and sometimes from one to four smaller basal spots between the last and the suture) and a posterior marginal stripe. The anterior part of the lateral margin of the pronotum, the femora, pygidium, and sides of the abdomen are sometimes orange, the antennal club is dark, with a pale footstalk, and the upper surface bears a clothing of extremely minute pale setæ.

Broadly oval, compact, and not very convex. The *head* is broad and not very flat, the *clypeus* a little produced and not divided from the forehead, and the ocular lobes angulate externally. The *pronotum* is fairly closely and not very finely punctured. The front angles are rather blunt, the lateral margins feebly rounded in front, nearly straight

behind, and the base is broadly rounded. The *elytra* are finely striate, the intervals flat, finely and rather numerously punctured. The *pygidium* is moderately finely and closely punctured. The metasternal shield and the sides of the *metasternum* are finely and fairly evenly punctured.

♂. The head is finely, not densely, punctured, and the clypeus is produced to a point, which is strongly reflexed. The anterior median part of the pronotum is flattened, the flattened area generally extending backward beyond the middle and limited by an angular elevation.

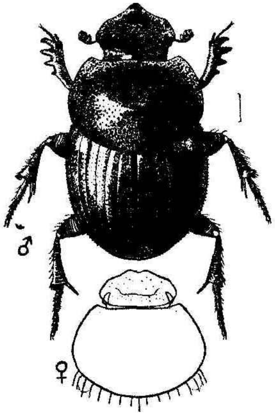

Fig. 40.—*Onthophagus deflexicollis*, ♂, and anterior part of ♀.

♀. The head is densely punctured, the clypeus bilobed in front, and the pronotum uniformly rounded.

Length, 4–5·5 mm. ; breadth, 3–4 mm.

U. PROV. : Haldwani, Kumaon Div. (*H. G. Champion*) ; SIKKIM : Gopaldhara, Rungbong Valley (*H. Stevens*). BENGAL : Singla, Darjeeling Dist., 1500 ft. (June). ASSAM : Gauhati (*T. Bainbrigge Fletcher*, May) ; Tura, Garo Hills, 1200–3900 ft. (*S. Kemp*, June–Aug.). BURMA : Ruby Mines (*W. Doherty*). TONKIN. MALAY PENINSULA. SUMATRA.

This curious little insect seems to be found only in vegetable

refuse. Dr. Stanley Kemp found it in numbers in rotting jack-fruit, and Mr. E. Jacobson informs me that in Sumatra it is found in the detritus beneath the sheaths of bamboo-stems.

283. **Onthophagus agaricophilus**, sp. n.

Deep metallic green or coppery, with the elytra rust-red, sometimes with the sutural margin and more or less of the adjacent surface dark, sometimes the whole surface nearly black, except a narrow red outer margin and one or two small red spots at the basal margin. The antennæ are pale yellow, and the upper surface bears exceedingly minute and rather scanty pale setæ.

Broadly oval and very convex, with the head shining, the pronotum slightly shining, and the elytra opaque. The *head* is well punctured, the sides are well rounded, the *clypeus* is separated from the forehead by a straight carina, and the vertex bears a pair of horns. The *pronotum* is rather finely and closely punctured, with a comparatively smooth flattened area at the front margin. The front angles are fairly sharp, the sides gently rounded in front, nearly straight behind, and the base rounded. The *elytra* are very finely striate, the intervals flat and very minutely asperately punctured. The *pygidium* is shining, rather strongly and closely punctured. The metasternal shield is finely and sparingly punctured, and the sides of the *metasternum* fairly strongly.

♂. The clypeus is triangular, pointed and reflexed in front, and punctured like the forehead. The posterior margin of the head is produced backward into a pair of upward-curving nearly parallel horns, the bases of which are rather abruptly dilated internally into flat, nearly quadrate plates. The anterior part of the pronotum is a little hollowed, the upper margin of the hollow curvilinear in the middle.

♀. The clypeus is rugosely punctured, and its front margin rounded. The vertex bears a pair of short erect horns. The pronotum is nearly vertical in front, and there are two slight contiguous prominences at the upper margin of the vertical part.

Length, 6–8 mm. ; breadth, 4 mm.

U. Prov. : Ranikhet (July), W. Almora (June, Aug., Sept.) (*H. G. Champion*) ; Mussoorie, 6000–7000 ft. (*Col. Harcourt*, Sept.).

Type in the British Museum.

Found by Mr. Champion in an Agaric fungus. This closely resembles *O. dubernardi* Bouc., but is remarkable for the existence of horns in both sexes. It differs also by its uniformly coloured pronotum.

284. **Onthophagus ensifer.**

Onthophagus ensifer Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 220.

Shining black, with a slight coppery or metallic lustre, the antennæ, mouth-organs and tarsi reddish, and the body above and beneath clothed with fine pale setæ.

Oval and moderately convex. The *head* is not very broad, the front margin is rounded, and the ocular lobes are rounded

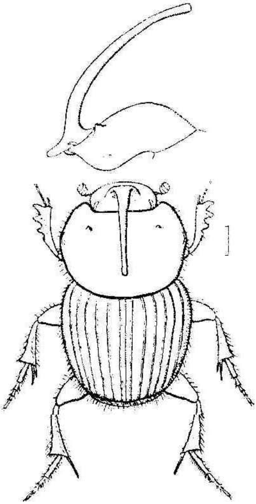

Fig. 41.—*Onthophagus ensifer*, ♂, and profile of head and thorax.

and moderately dilated before the eyes. The *pronotum* is rather strongly and closely punctured, the front angles are a little produced and fairly sharp, the lateral margins almost straight in front, sinuate behind, and the base rounded. The *elytra* are finely striate, the intervals nearly flat and bearing fine granules. The *pygidium* is shining and strongly punctured, the metasternal shield very smooth in the middle, sparingly

punctured at the sides, and the sides of the *metasternum* are rather finely and sparsely punctured.

♂. The clypeus is rather rugosely punctured, and separated by a slight curved carina from the forehead, from which rises a very long and slender but slightly flattened horn, gently curved, directed backward, and often extending past the middle of the body. The pronotum is very smooth and shining in front, feebly depressed in the median anterior part, and bears two small tubercles, widely separated, a little behind the front margin.

♂ (minor). The forehead bears an elevated transverse ridge, and the pronotum bears four small tubercles in a transverse row.

♀. The clypeus is rugose and separated by a curved carina from the forehead, and there is a similar but straight carina between the eyes. The pronotum bears four tubercles in a row behind the front margin, the two inner tubercles connected together.

Length, 5–7 mm. ; breadth, 3–4 mm.

S. INDIA : Nilgiri Hills, 5000 ft. (*H. L. Andrewes*) ; Sims Park, Coonoor (*F. H. Butcher*, June) ; Kodaikanal, Palni Hills (*J. Castets*) ; Shembaganur, Madura ; Anaimalai Hills.

Type in M. Boucomont's collection.

285. **Onthophagus phanæiformis.**

Onthophagus phanæiformis Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 224.

Dark chocolate-brown, with a metallic green or coppery lustre upon the head and pronotum, and each elytron decorated with two small bright yellow patches, one occupying the basal part of the 2nd, 3rd, and 4th intervals, the other upon the shoulder prominence and occupying the basal part of the 6th and 7th intervals.

Rather short and broad, not very convex, moderately shining, with a clothing of very fine, erect, scattered pale setæ. Rather strongly and closely punctured above, the *pronotum* with the base feebly rounded and not margined, the *elytra* finely but distinctly striate, with faint punctures, the dorsal intervals very slightly convex, rather strongly and closely punctured. The *pygidium* is coarsely and fairly closely punctured.

♂. The clypeus is almost semicircular, not produced, and not excised in front, very shining but rather closely punctured, separated by a feeble carina from the forehead, which is armed with a long, slender horn, curving upward and backward. The pronotum has a sharp longitudinal median carina extending past the middle and continued by a groove to the base, the

sides are flat on each side of the carina, and the hind angles are produced obliquely backward as strong hooked and upward-curved processes, smooth and hollowed above, each continued at the base by an oblique carina. The front tibia is short and stout.

♀. Unknown to me.

Length, 8·5 mm. ; breadth, 5 mm.

Burma : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.).

Type in the Genoa Museum.

This is closely related to *O. bifasciatus* F., but much larger, and has more reduced pale markings.

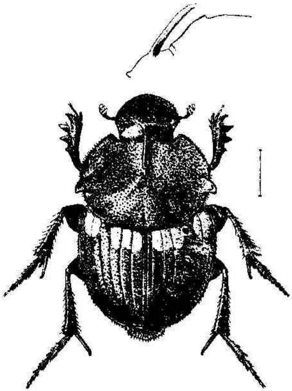

Fig. 42.—*Onthophagus phanæiformis*, ♂, and profile of head and thorax.

286. **Onthophagus frugivorus**, sp. n.

Black or very dark chocolate-brown, not shining, the head and pronotum sometimes with a very feeble coppery lustre, each elytron decorated with minute yellow patches at the base of the 2nd, 3rd (occasionally absent), 4th, 6th and 7th intervals. The yellow colour sometimes suffuses nearly the whole surface of the elytra. The upper surface is clothed with very minute and not very conspicuous erect pale setæ.

Oval and highly convex, rather deeply waisted. The

head is not very broad, rather closely and moderately finely punctured, with the clypeal margin strongly and evenly rounded, and the ocular lobes rounded and fairly prominent. The *pronotum* is strongly, evenly, and fairly closely punctured. The front angles are prominent, but not very sharp, the lateral margins straight in front and feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely and shallowly striate, and the intervals are flat and bear minute scattered granules. The *pygidium* is moderately strongly and closely punctured. The metasternal shield bears fine scattered punctures, and the sides of the *metasternum* are strongly and closely punctured.

♂. The head bears a long slender horn arising between the eyes and directed obliquely backward, straight at first, but curving downward toward the end. The anterior part of the pronotum is flat and sloping on each side of a longitudinal median ridge, in continuation of which a slight groove extends to the base. Above the hind angle on each side there is a strong outwardly directed lobe, deeply hollowed above and beneath. In minor examples the horn is short, and the thoracic lobes are represented only by a short sinuate longitudinal carina on each side.

♀. The head bears a rather indistinct curved clypeo-frontal carina and a short, straight, and more distinct one between the eyes. The pronotum is simply convex.

Length, 6–7 mm. : breadth, 4 mm.

ASSAM : Garo Hills, above Tura, 3500–3900 ft. (*Dr. S. Kemp*, July, Aug.).

Type in the British Museum ; co-types in the Calcutta Museum.

This has a close resemblance to *O. phanæiformis* Bouc., but, although rather smaller, shows a greater development of the cephalic horn and thoracic lobes. The upper surface is rather more opaque than that of *O. phanæiformis* and the elytra have very minute granules in the intervals instead of simple punctures.

A number of specimens were found by Dr. Kemp upon rotten fruit. Others were taken on a fungus.

287. **Onthophagus carinensis.**

Onthophagus carinensis Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 223.

Shining black, the head and pronotum, and sometimes the pygidium, suffused with a coppery or greenish lustre, each elytron with two transverse basal orange marks, one upon the shoulder, sometimes almost reaching the outer margin, the other upon the 2nd, 3rd, and 4th intervals. In some

specimens, perhaps a little immature, the elytra are entirely orange. The upper surface bears a fairly thin clothing of minute yellowish setæ, the antennæ and mouth-organs are yellow, and the tarsi red.

Broadly oval, compact and convex. The *head* is large, broad behind, the clypeus produced, with its front margin entire. The *pronotum* is strongly and fairly closely punctured, and bears a little behind the front margin three tubercles in a transverse line, the middle one two-cusped (or in some males represented by two distinct minute tubercles). The front angles are bluntly produced, the lateral margins straight in front, feebly sinuate behind, the hind angles very obtuse and the base rounded. The *elytra* are finely striate, the dorsal intervals nearly flat and moderately closely and not very finely punctured. The *pygidium* is strongly and deeply punctured. The metasternal shield is finely and sparsely punctured and setose, and the sides of the *metasternum* are strongly punctured and clothed with long hair.

♂. The head is very smooth and shining, finely and sparsely punctured, with the clypeal margin strongly elevated in the middle, a very slight pointed elevation dividing the clypeus from the forehead, and the vertex between the eyes produced backward into a pointed horn curving upward at the tip. The front margin of the pronotum is vertical, smooth, and feebly punctured, with four minute tubercles at the upper margin of the declivity, the two inner tubercles generally united but sometimes separated.

♀. The clypeus is closely transversely rugose, separated by a very strongly elevated curved carina from the smooth and feebly punctured forehead, behind which is a very strong straight carina. The pronotum bears a strong erect process, slightly bifid at the tip, immediately behind the front margin in the middle, and a slighter process on each side of it.

Length, 8–9 mm. ; breadth, 4·5–5 mm.

BURMA : Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.). *Type* in the Genoa Museum.

288. **Onthophagus dichropygus.**

Onthophagus dichropygus Gill.,* Ann. Soc. Sci. Brux. xliv, 1925, p. 232.

Black, with a coppery lustre upon the pronotum, the elytra bright yellow, with a broad irregular median black band, a basal spot on the 5th interval, the sutural and posterior margins black, and the pygidium with a bright yellow median stripe dilated at the apex.

Very short, compact and convex, shining, rather uniformly punctured above, and clothed with minute and inconspicuous,

but not very sparse, greyish setæ. The *head* is shining, scarcely produced in front, with the *clypeus* transversely rugose in both sexes, the forehead very smooth and shining and separated by a short rounded carina from the clypeus. The *pronotum* is very convex, strongly and closely punctured, slightly retuse and less closely punctured in front, with three dorsal tubercles before the middle, the median one in advance of the others. There is a longitudinal groove in the basal part, the front angles are subacute, the sides sinuate anteriorly, and the base is rounded and completely margined. The *elytra* are finely striate, the dorsal intervals flat and fairly strongly and closely punctured. The *pygidium* is fairly strongly punctured, shining, and sparsely setose, the *metasternum* bears strong scattered punctures, closer at the sides, and the middle and hind femora are strongly and uniformly punctured.

♂. The vertex has only a vestige of a carina and the front tibia is not very massive.

♀. The vertex bears a strong straight carina, with its extremities slightly angular. The front tibia is very massive.

Length, 7·5 mm.; breadth, 4 mm.

BURMA: Bhamo (*L. Fea*, June); Teinzo (*L. Fea*, May).

Type in Dr. J. J. Gillet's collection.

Although a horned form of the male is unknown, it is very likely that one exists, as in *O. bifasciatus* F., to which there is the closest relationship. It is distinguished by the yellow stripe upon the pygidium. It also resembles *O. unifasciatus*, but differs by the shorter median groove of the pronotum, which does not reach the median tubercle.

289. **Onthophagus bifasciatus.**

Scarabæus bifasciatus F.,* Spec. Ins. i, 1781, p. 25.
Onthophagus birmanicus Har.,* Col. Hefte, xvi, 1879, p. 226 (new syn.).

Black, with the head and pronotum more or less coppery or metallic and the elytra orange, with the suture, a small spot close to the base on the 5th interval, a very irregular transverse median band extending from side to side, and a narrow posterior marginal band on the 3rd, 4th, and 5th intervals, black. The median band may be interrupted, forming a sutural and two lateral masses, or it may become united with the anterior and posterior spots, leaving only two anterior and one posterior orange spots on each side. The antennæ and tarsi are red.

Very short, broad and convex, the surface of the body shining but clothed above and beneath with minute and inconspicuous yellow setæ, replaced by longer hairs upon the

legs and the sides of the metasternum. The *head* has the outer margin rounded, with a slight flattening in the middle. The *pronotum* is strongly and moderately closely punctured, with its anterior part smoother, the posterior part bearing a median longitudinal groove, which is rather deep at the basal margin. The front angles are rather sharp. The *elytra* are very distinctly striate, with the dorsal intervals slightly convex and rather closely irregularly punctured. The *pygidium* is strongly and fairly closely punctured. The femora and the metasternal shield are strongly but not closely punctured, and the sides of the *metasternum* are closely punctured.

♂. The clypeus is lightly transversely rugulose in front and scantily punctured, and the forehead bears a long slender horn, gently curving backward. The pronotum is broadly flattened in front or lightly excavated on each side, with a slight median longitudinal keel, the lateral margin of the excavation carinate and produced into a bluntly angular process on each side behind the posterior margin, sharply angulate in the middle.

In males of minor development the horn is very short or reduced to a small round tubercle, and the clypeus is separated from the smooth forehead by a curved carina as in the female. The pronotum bears three tubercles in a transverse line before the middle, and is very slightly excavated in front of them.

♀. The clypeus is finely transversely rugulose and separated by a curved carina from the forehead, which is smooth and very feebly punctured. The vertex bears a strongly elevated straight carina. The pronotum bears three tubercles placed transversely behind the front margin, the middle one in advance of the two lateral ones.

Length, 5–7 mm. ; breadth, 3–4 mm.

BURMA : Akyab (*S. C. Sen*, May) ; Mandalay (*L. Fea*, May) ; Teinzo (*L. Fea*, May). ASSAM : Nangpoh, Khasi Hills (*D. Nowrojee*, July) ; Sylhet. SIKKIM : Gopaldhara, Rungbong Valley (*H. Stevens*) ; Ghumti, Darjeeling Dist., 4000 ft. (*F. H. Gravely*, July). BENGAL : Calcutta (Jan., Mar.) ; Howrah (*M. O. T. Iyengar*, Feb.) ; Faridpur, Berhamganj (*A. C. Dey*, April). BIHAR : Ranchi (*M. O. T. Iyengar*, Aug., Oct.) ; Pusa (*D. Nowrojee*, April). S. INDIA : Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum ; that of *birmanicus* Har. in M. René Oberthür's collection.

A specimen was found upon a dead rat by Dr. Gravely.

This species and *O. unifasciatus* F. are the species most commonly found in cases of what is known in India as " scarabiasis," a disorder of young children, in which living

beetles are passed with the fæces. Fairly numerous cases have been recorded, and several memoirs have been published on the subject (see the Introduction to this volume). In six different cases the specimens referred to me have proved to belong to the present species.

290. **Onthophagus unifasciatus.** (Plate I, fig. 5.)

Scarabæus unifasciatus Schall., Abh. Hall. Nat. Ges. i, 1783, p. 240; F., Ent. Syst. i, 1792, p. 49.
Onthophagus prolixus Walk.,* Ann. Mag. Nat. Hist. (2) iii, 1858, p. 208.

Fiery red, golden, coppery, green or dark blue, with the elytra bright yellow, decorated with a broad, irregular black median band, a spot upon the 5th interval close to the base, a transverse spot adjoining the apical margin, and the suture of the same colour.

Very short, convex and compact, shining, rather uniformly punctured above, with a sparse and inconspicuous clothing of minute setæ. The *head* is subcircular in shape, with the front margin reflexed. The *pronotum* is rather strongly punctured everywhere, obliquely retuse in front, and with three dorsal prominences midway between the front and hind margins, the two lateral ones forming short longitudinal carinæ, the median one longitudinally impressed, and the groove continued backward to the base. The front angles are rather sharp and the base is rounded. The *elytra* are finely striate, with the dorsal intervals flat, rather closely punctured but shining. The *pygidium* is shining, rather strongly punctured and clothed with decumbent grey hair, and the *metasternum* is strongly and rather uniformly punctured.

♂. The clypeus is lightly punctured and shining and the clypeal carina is indistinct. The front tibia is a little less massive than that of the female.

♀. The clypeus is closely transversely rugose and the carina well developed.

Length, 6–9 mm.; breadth, 4–5 mm.

BENGAL: Faridpur (School of Tropical Medicine, Calcutta, Aug.). BIHAR: Ranchi. U. PROV.: Fyzabad (*W. H. G. Hingston*). C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*). BOMBAY: Poona (*E. T. Atkinson*); Belgaum (*H. E. Andrewes*). MADRAS: Chipurupalle, Vizagapatam Dist. (*R. S. Patuck*); Thanelanka, Godavari Dist. (*T. V. Ramakrishna*, Dec.); Parur, S. Arcot Dist. (May); Yemmiganur, Bellary Dist. (Aug.); Kinavallore, S. Malabar (*P. S. Nathan*, April); Coimbatore (*M. K. Kutty*, Aug.); Nilgiri Hills (*H. L. Andrewes*); Chikkaballapura (*T. V. Campbell*); Trichinopoly (*R. O. Jermyn*). CEYLON: Kandy (*E. E. Green*, Sept., Oct.); Colombo (*G. M. Henry*, Aug.); Battaramulla, W. Prov. (*G. M. Henry*, Mar.); Wellawaya

(*G. M. Henry*, Dec.); Bogawantalawa, 4900–5200 ft. (*G. Lewis*, Feb., Mar.); Dikoya, 3800–4200 ft. (*G. Lewis*, Dec., Jan.).

Type unknown; that of *prolixus* Walk. in the British Museum.

This species has a deceptive resemblance in its pattern and general appearance to *O. bifasciatus*, or, at least, to the female of that insect, but it is a peculiar form in which the head is entirely unarmed in both sexes and the thoracic armature alike in both.

O. unifasciatus is the form most commonly associated with "beetle disease" or "scarabiasis" (see the previous species). It is the species referred to by R. Senior-White in the 'Indian Journal of Medical Research,' vol. vii, p. 568 (see Iyengar, 'Indian Medical Gazette,' vol. lxiii, No. 7, 1928, p. 365). Although called *Onthophagus bifasciatus* by Senior-White, his figure shows clearly that the present insect is the one concerned. The two other figures upon the same plate represent examples of two other species. The specimen recorded above from Ranchi occurred in the same way, the patient being a child two years old.

Dr. Beeson has found this species in a dead lizard at Bangalore, and it has also been found in heaps of decaying grasshoppers at Yemmiganur.

291. **Onthophagus nagpurensis**, sp. n.

Coppery or metallic green, with the elytra black or brownish-black, each decorated with an orange patch at the shoulder and another at the posterior margin. The antennæ and mouth-organs are yellow and the upper surface is rather closely clothed with fine, erect, and strongly curved setæ.

Broadly oval, compact and very convex. The *head* is moderately broad, bluntly angular on each side in front of the eyes, with the clypeus straight in the middle. The *pronotum* is fairly strongly and closely punctured, except in front. The front angles are slightly but not very sharply produced, the sides are almost straight in front and feebly sinuate behind, the hind angles very obtuse, and the base well rounded. The *elytra* are very finely striate, the intervals flat and not very finely punctured. The *pygidium* is fairly strongly and not very closely punctured, the metasternal shield is finely and sparsely punctured, with a smooth middle line, and the sides of the *metasternum* rather more strongly.

♂. The clypeus is smooth and bears only a few scattered punctures. It is separated from the forehead by a feeble curved carina, and between the eyes arises a long slender horn, flattened at the base, strongly curved, directed backward and blunt at the end. The anterior part of the pronotum is flattened

and very lightly punctured, and separated from the posterior part by a very prominent oblique carina on each side and a biangulate median prominence, separated by a curved line from the lateral carina.

♀. The clypeus is transversely rugose and separated by a strong carina from the forehead, and there is a very strong straight carina between the eyes. The front margin of the pronotum is nearly vertical in the middle, smooth, and very lightly punctured, and its upper edge forms a strong rounded carina.

Length, 5–6 mm. : breadth, 3–3·5 mm.

CHOTA NAGPUR : Nowatoli (*Cardon*, Oct.).

Type in the British Museum.

292. **Onthophagus centricornis.**

Copris centricornis F.,* Ent. Syst., Suppl. 1798, p. 33.
Copris luteipennis Wied.,* Zool. Mag. ii, 1, 1823, p. 20.
Onthophagus minutus Motsch., Etudes Ent. vii, 1858, p. 54.

Black, usually with a coppery lustre upon the head and pronotum, and the elytra, legs, antennæ, and mouth-organs

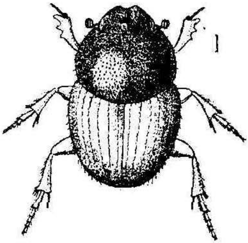

Fig. 43.—*Onthophagus centricornis* †.

orange or yellow. There is a clothing of very minute greyish setæ upon the upper and lower surfaces.

Very small, broadly oval, compact and moderately convex. The *head* is short and broad, the *clypeus* sparsely punctured, with the margin rounded and very feebly excised in the middle. The *pronotum* is evenly and moderately strongly and closely punctured. The sides are strongly rounded, scarcely sinuate behind, and the base is gently rounded. The *elytra* are finely striate, the 7th stria strongly curved, the intervals flat, with

† Through an oversight, the head of the male and the front tibiæ of the female are represented in this figure.

extremely minute and scanty asperate punctures, bearing minute setæ. The *pygidium* is finely and not closely punctured. The *metasternum* bears a very few punctures in the middle and larger and more numerous ones at the sides. The legs are short, the middle and hind tibiæ very short. The antennæ are composed of eight joints only.

♂. The head bears a short, straight, erect horn just before the eyes. The front tibia is stout and armed with four teeth set at right angles, and the apical margin of the tibia is almost at a right angle to the inner margin. The front angles of the pronotum are bluntly produced.

♀. The clypeus is separated from the sparsely punctured shining forehead by a strongly curved carina, and there is a slight posterior carina between the eyes. The front angles of the pronotum are a little produced but not sharp. The *front tibia is armed with four oblique teeth, and the apical* edge is not at a right angle to the inner edge.

Length, 2·5–3 mm.; breadth, 1·5–2 mm.

C. Prov.: Nagpur, 1000 ft. (*E. A. D'Abreu*); Balaghat, Raigarh (*C. F. C. Beeson*, July). Bombay: Belgaum (*H. E. Andrewes*); Kanara (*T. R. D. Bell*). S. India: Nilgiri Hills (*H. L. Andrewes*). Ceylon: Colombo (*H. P. Green*, April; *G. Lewis*, June); Mt. Lavinia (*G. E. Bryant*, May); Wirawila, S. Prov. (*G. M. Henry*, July); Bintenne (*G. M. Henry*, Oct.); Negombo (*G. M. Henry*, Dec.).

Type in the Copenhagen Museum; also that of *luteipennis* Wied.

This has a remarkably close similarity to *Caccobius unicornis* F., and, in the male sex, in which, as in the genus *Caccobius*, the anterior edge of the front tibia is at a right angle to the inner edge, is not always easy to distinguish from it if the specimen is not in perfect condition. It is on the average *a shade smaller, the head and prothorax are metallic, the* front angles of the latter less blunt, and the elytra bright ochreous-yellow. The cephalic horn of the male is not quite so far forward, and has not so well defined a depression behind it. The female is more easily distinguished, having the front tibia oblique, instead of squared, at the end, and the front angles of the pronotum a little more produced.

293. Onthophagus vaulogeri.

Onthophagus vaulogeri Bouc.,* Bull. Soc. Ent. France, 1923, p. 10.

Black and shining, with the head and pronotum deep blue or green and each elytron decorated with an orange patch at the base, usually extending from the outer margin almost to the suture, and sometimes also a smaller patch near the apical margin. The antennæ, mouth-organs, and tarsi are

reddish, and the upper surface is fairly closely clothed with very minute greyish setæ.

Oval, compact and convex. The *head* is very smooth, shining and sparsely punctured. The sides are rounded and the *clypeus* is a little produced. The *pronotum* is rather finely, closely and evenly punctured. The front angles are a little produced, the sides straight in front and feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the intervals flat and finely and fairly closely punctured. The *pygidium* is moderately finely and closely punctured, and the *metasternum* bears fairly fine and extremely scanty punctures upon the shield and at the sides.

♂. The clypeus is produced to a blunt point in front and strongly reflexed, the sides of the head are a little dilated and reflexed, and the posterior part is produced backward as a triangular plate, the apex of which curves upward as a short pointed horn. The front margin of the pronotum is smooth and shining and has a slight depression behind the cephalic process. The front tibiæ are elongate and curved.

♀. The clypeus is emarginate in front and separated by a curved carina from the forehead, and there is a straight carina between the eyes.

Length, 4–6 mm.; breadth, 2·5–3·5 mm.

U. PROV.: New Forest, Dehra Dun (*G. D. Bhasin*, May). ASSAM: Shillong, 5000 ft. (*T. Bainbrigge Fletcher*, June, July). BURMA: Rangoon (*H. L. Andrewes*, May); Tharrawaddy (*G. Q. Corbett*). INDO-CHINA.

Type in the British Museum.

294. **Onthophagus malabarensis.**

Onthophagus malabarensis Bouc.,* Ann. Soc. Ent. France, lxxxviii, 1919, p. 314.

Deep green or coppery, usually with the head and pronotum brighter green or blue, and the elytra bright orange, with a black sutural line and irregular post-median bar, usually extending from side to side a little obliquely, but sometimes with a detached patch near the middle of the outer margin. The abdomen and pygidium are black, the tarsi, antennæ, and mouth-organs reddish, and there is a rather thin clothing of short erect yellowish setæ above.

Broadly oval, very compact and convex. The *head* is not wide, the *clypeus* is slightly bilobed, and the sides are gently rounded. The *pronotum* is moderately strongly, evenly and closely punctured, the front angles are not very sharp, the sides are almost straight in front and very feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the intervals flat and finely but distinctly punctured, chiefly

in double series. The *pygidium* is shining and fairly strongly punctured. The *metasternum* is sparingly, unevenly, and fairly strongly punctured.

♂. The head is smooth, with fine scattered punctures, the clypeus a little produced, and the posterior margin of the head produced backward as a triangular lamina, of which the apex curves upward, forming a short pointed horn. The pronotum is a little hollowed at the middle of the front margin.

♀. The clypeus is transversely rugose and separated by a gently curved carina from the well-punctured forehead. There is a straight carina behind the eyes. The pronotum has a blunt tubercle just behind the front margin on each side of the middle.

Length, 4–5 mm. ; breadth, 2·5–3 mm.

U. Prov. : Sitapur (*H. G. Champion*, July). Bombay : Igatpuri, 2000 ft. (*H. Maxwell Lefroy*). S. India : Chanthanthod, Wynaad (*Y. R. Rao*, Nov.).

Found feeding upon dead locusts at Igatpuri.

This species has a close resemblance to *O. ludio* Bouc., especially in the female sex, but the transverse black band of the elytra is placed farther forward, the elytral intervals are simply punctured, the pronotum is less distinctly margined behind, and the two anterior prominences are less developed.

295. **Onthophagus ludio.**

Onthophagus ludio Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 218.

Black and shining, with the pronotum and the posterior part of the head metallic green or deep blue and the elytra bright yellow with black markings, consisting of a sutural line, a transverse patch crossing the suture at the base, an irregular transverse bar crossing it well beyond the middle, and a patch near the middle of the outer margin, sometimes uniting with a small patch near the middle of the base. The antennæ and mouth-organs are yellowish, as well as the clothing of setæ, which are minute and inconspicuous upon the upper surface and longer upon the pygidium and lower surface.

Broadly oval, very compact and convex. The *head* is shining, not broad, the sides are gently rounded, the *clypeus* lightly rugose, rather sharply bidentate in front, the forehead sparsely punctured. The *pronotum* is strongly, evenly, and fairly closely punctured, with a blunt tubercle on each side of the middle a little behind the front margin, the front angles are not very sharp, the sides are very slightly rounded in front and feebly sinuate behind, and the base is rounded and margined. The *elytra* are finely striate, the intervals flat,

generally with a row of fine granules or aciculate punctures on each side of each interval. The *pygidium* is shining, strongly and deeply punctured, and the *metasternum* is rather strongly punctured, moderately closely in front and more sparingly behind and at the sides.

♂. The posterior margin of the head is produced backward as a triangular lamina, the apex of which is drawn into a short pointed horn curving upward. The pronotum is a little hollowed between the two tubercles.

♀. The head bears a sharp straight carina behind the eyes.

Length, 4–6 mm.; breadth, 3–3·5 mm.

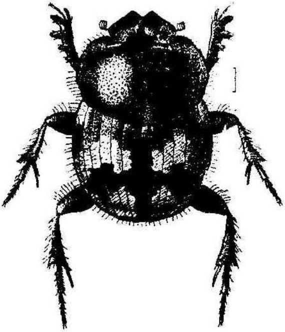

Fig. 44.—*Onthophagus ludio*, ♂.

C. Prov.: Nagpur, 1000 ft. (*E. A. D'Abreu*, Aug.). Bombay: Belgaum (*H. E. Andrewes*). Madras: Barkuda I., L. Chilka, Ganjam Dist. (*N. Annandale*, Oct.); Madras City (*M. O. T. Iyengar*, April); Samalkot (*Menon*, June, July); Sidapur, Coorg, 3500 ft. (*T. V. Ramakrishna*, April); Nilgiri Hills (*G. F. Hampson*). Ceylon: Colombo (*G. M. Henry*).

Type in M. Boucomont's collection.

O. ludio has a very great resemblance to *O. malabarensis*, but the transverse bar crossing the elytral suture is placed farther back than in that species, the intervals bear fine granules or granular punctures, and the pronotum is usually blue, instead of green, in colour, and distinctly margined at the base.

296. Onthophagus nitidulus.

Onthophagus nitidulus Klug, Symb. Phys. 1845, v, pl. 41, fig. 12; Reitt., Verh. Ver. Brünn, xxxi, 1893, p. 184; d'Orb., L'Abeille, xxix, 1898, p. 203.

Black and very shining, with a slight metallic lustre, the elytra bright yellow, each having the sutural interval and an oblique row of three spots near the middle of the 3rd, 5th, and 7th intervals black. The antennæ, tarsi, and mouth-organs are reddish and the upper surface is thinly clothed with minute pale setæ.

Elongate-oval and very convex. The *head* is not broad, its sides are gently rounded and the front margin is very feebly sinuate. The *clypeus* is asperately punctured but shining, and separated by a strong curved carina from the almost unpunctured forehead. The *pronotum* is fairly strongly but not closely punctured. The front angles are rather sharp, the sides nearly straight in front and feebly sinuate behind, and the base is strongly rounded. The *elytra* are finely striate, the intervals slightly convex and finely and sparingly punctured. The *pygidium* is fairly strongly and closely punctured. The metasternal shield is very smooth in the middle and finely and sparsely punctured at the sides, and the sides of the *metasternum* are rather more strongly and closely punctured.

♂. The head bears a long slender horn arising between the eyes, where it is broad and flat, directed backward, tapering gradually to the extremity, and following the curvature of the thorax, which is smooth and unpunctured in its anterior median part.

♀. The head bears a very strong straight carina between the eyes, and the pronotum has a slight double prominence immediately behind the front margin.

Length, 5–7 mm.; breadth, 3–4 mm.

SIND: Karachi (*M. Maindron*). PERSIA. ARABIA. EGYPT. ABYSSINIA. NUBIA. SOMALILAND.

Type in the Berlin University Museum.

297. Onthophagus cervus.

Copris corvus F.,* Ent. Syst., Suppl. 1798, p. 31.
Copris cervus F., Syst. Eleuth. i, 1801, p. 46.
Copris nuchidens F.,* Ent. Syst., Suppl. 1798, p. 31 (new syn.).
Onthophagus ceylonicus Har.,* Ann. Mus. Civ. Genova, x, 1877, p. 61.

Shining black, with the head and pronotum, and occasionally also the elytra and lower surface, coppery or greenish-black, and the elytra decorated with orange, forming a broad external margin, extending almost to the suture posteriorly, but generally irregular, and only reaching the 4th elytral interval basally,

the lateral margin sometimes interrupted on the 7th interval or wanting in the middle. Sometimes only irregular humeral and apical spots are present. The femora, antennæ, mouth-organs, pygidium, and sides of the abdomen are also usually yellow, and the upper surface is thinly clothed with minute yellow setæ.

Oval and moderately convex. The *head* is not very broad, the ocular lobes rounded at the sides and not projecting much in front of the eyes. The *clypeus* is a little produced, its margin strongly reflexed and straight in the middle. The *pronotum* is fairly strongly, not very closely but unevenly punctured, with smaller punctures intermixed. The front angles are rather sharp, the lateral margins straight in front, sinuate behind, and the base rounded. The *elytra* are finely striate,

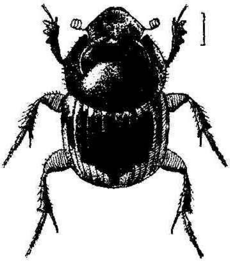

Fig. 45.—*Onthophagus cervus*, ♂.

the intervals slightly convex and rather finely but unevenly punctured. The *pygidium* is punctured like the pronotum with intermixed large and small punctures. The metasternal shield bears only a very few fine punctures, and the sides of the *metasternum* bear larger but not very numerous punctures.

♂. The clypeus is a little produced, but truncate and not pointed, very shining, lightly punctured with intermixed large and small punctures, and separated from the forehead by a not very strong carina. A pair of horns arise behind the eyes, sloping backward, broad at the base but not united, each bent at a right angle internally just beyond the base, curved outward and rapidly narrowed. The pronotum is rather flat, smooth, and shining in its anterior part.

♀. The clypeus is strongly and closely punctured and not shining, separated from the forehead by a strong carina, and there is a similar carina between the eyes. There is a slight prominence in the middle of the anterior part of the pronotum just behind the front margin.

Length, 6–7 mm. ; breadth, 3·5–4·5 mm.

BENGAL : Calcutta (*M. O. T. Iyengar*, Feb.). U. PROV. : Dehra Dun (*S. N. Chatterjee*, May ; *Col. Harcourt*, Oct.) ; New Forest, Dehra Dun (*G. D. Bhasin*, Nov.). C. PROV. : Balaghat (*B. M. Bhatia*, Mar., June, July). C. INDIA : Jaithari Range, Umaria, Rewah State (*C. F. C. Beeson*, Nov.) ; Satna, Rewah State (*B. M. Bhatia*, Nov.). BOMBAY : Poona (*E. T. Atkinson*) ; Belgaum (*H. E. Andrewes*) ; Kanara (*T. R. D. Bell*). S. INDIA : Nilgiri Hills (*H. L. Andrewes*) ; Coimbatore (*P. V. Isaac*, June, Oct., Nov.) ; Pondicherry ; Calicut. CEYLON : Colombo (*G. Lewis*, April ; *G. M. Henry*, Aug.) ; Kandy (*G. E. Bryant*, June) ; Galle (*G. Doria*, May) ; Battaramulla (*G. M. Henry*, Mar.) ; Homagama, W. Prov. (*G. M. Henry*, Mar.) ; Murunkan, N. Prov. (*E. E. Green*, July) ; Kanthalai (*G. M. Henry*, May) ; Horowupotana, Kotte (*G. M. Henry*, Oct.). N. ANDAMAN I. : Bonington (*B. M. Bhatia*, Dec.).

Type in the Copenhagen Museum ; also that of *nuchidens* F. ; that of *ceylonicus* Har. in the Genoa Museum.

This is one of the most abundant of the Indian Coprinæ.

298. **Onthophagus falsus.**

Onthophagus falsus Gill.,* Ann. Soc. Sci. Brux. xliv, 1925, p. 236.
Onthophagus cervus d'Orb. (not Fab.), L'Abeille, xxix, 1898, p. 214.

Shining black or dark brown, with the head and pronotum, and occasionally also the elytra and lower surface, coppery or greenish-black, the elytra decorated with orange markings, usually consisting of irregular front and hind margins, sometimes reduced to small humeral and apical spots, and occasionally united along the 6th and outermost intervals. The antennæ, mouth-organs, femora, pygidium, and the sides of the abdomen may also be orange in colour, and the upper surface is thinly clothed with minute pale yellow setæ.

Broadly oval and moderately convex. The *head* is not very broad, the ocular lobes are gently rounded at the sides and project little in front of the eyes, and the *clypeus* is a little produced. The *pronotum* is strongly punctured, with a few smaller punctures intermixed with the large ones. The front angles are rather sharply produced, the lateral margins nearly straight in front, sinuate behind, and the base rounded. The *elytra* are finely striate, with the intervals slightly convex and finely punctured. The *pygidium* is strongly but unevenly

punctured, the metasternal shield sparsely punctured at the sides, and the sides of the *metasternum* are strongly but not closely punctured.

♂. The head is shining and bears large and small punctures intermixed, especially at the sides. The clypeus is produced to a blunt point, which is strongly reflexed, and is not distinctly separated from the forehead. The posterior edge of the vertex is produced into a pair of unconnected horns, very broad and directed backward at the base, with a small sharp tooth on the outer edge of each, beyond which they curve upward and are tapered, bisinuate, and sharp at the tip. The anterior part of the pronotum is rather abruptly steep and almost unpunctured.

♀. The clypeus is rugosely punctured and not shining, the margin is truncate in the middle, the forehead is separated

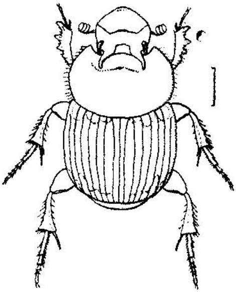

Fig. 46.—*Onthophagus falsus*, ♂.

by a strong carina, and there is a similar carina between the eyes. There is a short straight carina just behind the front margin of the pronotum in the middle.

Length, 5·5–7·5 mm. ; breadth, 3–4 mm.

SIND : Karachi (*M. Maindron*, Aug., Sept.). KASHMIR : Sonamarg (*T. R. D. Bell*). BENGAL : Dacca. ASSAM : Patkai Hills (*W. Doherty*).

Type in the Paris Museum ; co-type in the British Museum.

O. falsus is the representative in the North of the common *O. cervus* of the rest of the country. It has a very close resemblance to that species and may have precisely the same pattern, although the yellow colour of the elytra is more

often reduced to disconnected front and hind margins. The pronotum is a little more strongly punctured. The clypeus *of the male is pointed and not truncate, and the horns have* a small tooth on the outer side of each near the base.

299. **Onthophagus proletarius.**

Onthophagus proletarius Har., Col. Hefte, xiii, 1875, p. 89; Bouc., Vitalis, Faune Ent. de l'Indoch. iv, 1921, p. 56.

Dark brown or black, with the head and pronotum suffused with a metallic lustre and the femora and an anterior and posterior marginal patch upon each elytron orange-yellow, the basal patch usually not reaching the inner and outer lateral margins and sometimes confined to the 4th, 6th, and 7th intervals, the posterior patch not reaching the suture but generally extending a little way round the outer margin. The club of the antenna is yellow, and the body is clothed above and beneath with rather numerous short but not very conspicuous yellow setæ.

Oval and rather convex. The *head* is not broad, the sides are gently rounded, and the clypeal margin is entire. The *pronotum* is rather finely, closely, and evenly punctured, the front angles are moderately sharp, and the sides straight in front and feebly sinuate behind. The *elytra* are finely striate, with the intervals flat and minutely punctured. The *pygidium* is shining and rather strongly punctured. The metasternal shield is very smooth, shining, and scarcely perceptibly punctured, and the sides of the *metasternum* are moderately and rather evenly punctured.

♂. The clypeus is produced into a blunt reflexed lobe, and, like the forehead, from which it is not separated, is shining and rather feebly and unevenly punctured. Behind the eyes arises a pair of slender, backwardly directed, parallel horns, curving upward and acute at the tips. Each has a sharp internal tooth at a little distance from the base, and between the two horns is a short, sharp, and slender intermediate process. The prouotum is a little hollowed, smooth and shining just behind the head.

♀. The clypeus is transversely rugulose, with the front margin rounded, except in the middle, where it is straight. The forehead is well punctured and shining, separated from the clypeus by a short, curved carina, and with a longer straight carina between the eyes. The middle of the front margin of the pronotum is vertical.

Length, 5–7 mm.; breadth, 3–4 mm.

Burma: Toungoo (*G. Q. Corbett*); Tavoy (*W. Doherty*). Malay Peninsula. Indo-China. S. China.

Type in M. René Oberthür's collection.

300. **Onthophagus duporti.**

Onthophagus duporti Bouc.,* Ann. Mus. Civ. Genova, xlvi, 1914, p. 228.

Chestnut-brown, with a light coppery lustre, the elytra testaceous-yellow, with longitudinal brown or black stripes at the inner and outer margins, and upon the inner part of the 3rd, 5th, and 7th intervals, the dark stripes usually more or less fused together in the middle line. The pygidium and the femora are also yellow, and there is a fairly close clothing of extremely minute pale setæ upon the upper surface.

Oval, fairly compact and convex, smooth and shining. The *head* is not very broad, and its sides are rounded and not angulate in front of the eyes. The *clypeus* is feebly produced, with its front margin rounded and strongly reflexed. The *pronotum* is unequally punctured, with large and small punctures. The front angles are a little produced but not very sharp, the lateral margins are nearly straight in front and feebly sinuate behind, and the base is rounded. The *elytra* are rather deeply striate, the intervals slightly convex and not very finely or sparingly punctured. The 7th stria is strongly curved. The *pygidium* is unequally punctured with intermixed large and small punctures, the metasternal shield is almost smooth in the middle, and its sides, as well as the sides of the *metasternum*, are distinctly but rather sparingly punctured.

♂. The head is very smooth and shining, with the punctures very fine and sparse, the clypeus separated from the forehead by a short transverse carina. Close to the inner margin of each eye is a short, erect, blunt, conical horn. The pronotum bears a small tubercle just behind the front margin in the middle and a pair placed a short distance apart midway between the front and hind margins, the space between the three tubercles slightly depressed but not smooth.

♀. The clypeus is closely transversely rugose and divided by a strong straight carina from the smooth, sparsely punctured forehead, and there is a similar carina between the eyes. There is a slight declivity on each side of the front margin of the pronotum.

Length, 6·5–8 mm.; breadth, 4·5–5 mm.

Burma: Bhamo (*L. Fea*, June, Aug.); Mandalay (*L. Fea*); Teinzo (*L. Fea*, May); Schwegu-Myo (*L. Fea*, Oct.); Asciuii Ghecu, Karen Hills, 4200–4500 ft. (*L. Fea*, April). Bihar: Pusa (*R. Saran*, May; *A. Murtaza*, June); Chapra (*Mackenzie*). S. India: Kanara (*T. R. D. Bell*); Nilgiri Hills (*A. K. Weld Downing*).

Type in the Genoa Museum; co-type in M. Boucomont's collection.

Specimens were found at Pusa in a rotten *Papaya*-stem.

Genus PHACOSOMA.

Phacosoma Bouc., Ann. Soc. Ent. France, lxxxiii, 1914, p. 249.

TYPE, *P. dytiscoides* Bouc. (*Borneo, Singapore*).

Range. Indo-Malayan Region.

Broadly oval and rather depressed in shape, with rather slender legs, the front tibia armed with three external teeth and minutely serrate between and above them, the middle and hind tibiæ long and not much dilated at the extremity. Front tarsus short and slender and the middle and hind tarsi long, rather narrow, and not much tapered from base to tip, with the basal joint about twice as long as the 2nd, the 2nd, 3rd, and 4th nearly equal. Head flat, with the ocular lobes broadly dilated, the clypeus not separated from the forehead, narrowed, and bidentate in front. Pronotum short and broad, the lateral margins angulate before the middle, nearly straight and parallel behind, with a short inner parallel carina at the base, and the base gently rounded. Scutellum absent. Elytra flat, with six dorsal striæ, and very sharply inflexed broad epipleuræ, the outer edge (representing the 7th stria) acutely recurved. Prothorax deeply hollowed beneath the front angles. Metasternum broad between the nearly parallel middle coxæ, separated from the mesosternum by a nearly straight line. Antennæ 9-jointed. Labrum broad, emarginate in front. Mandible long and narrow. Maxilla long, with a rather broad outer lobe. Mentum narrowed and emarginate in front, labial palpus rather narrow, with the 3rd joint not very minute.

Key to the Species of Phacosoma.

1 (2)	Upper surface opaque, with six spots...	*obscurum* Bouc., p. 354.
2 (1)	Upper surface shining, with two spots or none.	
3 (4)	Elytra strongly punctured	*triste*, sp. n., p. 355.
4 (3)	Elytra feebly punctured or not at all.	
5 (6)	Broadly oval, bimaculate	*lætum*, sp. n., p. 356.
6 (5)	Narrowly oval, without spots	*cingalense*, sp. n., p. 357.

301. Phacosoma obscurum.

Phacosoma obscurum Bouc.,* Ann. Soc. Ent. France, lxxxviii, 1920, p. 307.

Black and rather opaque above, with the head, the front angles of the pronotum, and the legs, antennæ, and mouth-organs red, and each elytron decorated with three yellow spots, one upon the 5th, 6th, and 7th intervals just behind the base, one upon the same intervals beyond the middle, and one at the apical margin upon the 2nd, 3rd, and 4th intervals.

There is an extremely fine and inconspicuous clothing of setæ upon the upper surface.

Oval and depressed in shape. The *head* and *pronotum* are densely punctured, the punctures of the latter very deep, rather elongate, and, at the sides, extremely dense. The *elytra* are finely and shallowly striate, the intervals very feebly convex, finely rugose, and scarcely perceptibly punctured. The *pygidium* is convex, opaque at the base, shining and punctured at the apex. The metasternal shield is finely and closely punctured at the sides and almost smooth in the middle, and the sides of the *metasternum* are finely and sparsely punctured.

♂. The front and hind femora are broadly triangular, the lower edge produced to an angle. The tibiæ are strongly curved, especially the hind pair, which are long and rather abruptly angularly dilated at the end.

♀. The femora are simple and the tibiæ gently curved.

Length, 4–5 mm.

Burma : Pegu.

Type in M. Boucomont's collection.

302. **Phacosoma triste**, sp. n.

Shining black, with the legs, mouth-organs, and foot-stalk of the antenna reddish and the antennal club black, and clothed above with extremely fine and inconspicuous setæ.

Very broadly oval and moderately convex. The *head* and *pronotum* bear moderately fine and close annular punctures, which are a little larger and closer at the sides than in the middle. The *elytra* bear very shallow striæ composed of chains of coalescing pits, and the intervals are almost flat and moderately closely punctured with annular punctures similar to those of the head and pronotum. The *pygidium* is very convex and closely punctured with similar annular punctures. The metasternal shield is finely and fairly closely punctured, except in the middle, which is almost smooth, and the sides of the *metasternum* and abdomen bear close shallow oval pits. The front tibia is broad, the middle and hind tibiæ are almost straight, and the hind pair are slender.

I have found no sexual difference.

Length, 4–5 mm. ; breadth, 3–3·5 mm.

S. India : Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

I have seen only two specimens.

P. triste is rather shorter and more rotund than the other species, the elytra are much more distinctly punctured, the whole upper surface being almost uniformly sculptured, and the yellow elytral spots of *P. obscurum* and *P. lætum* are absent.

303. **Phacosoma lætum**, sp. n.

Black and shining, with the legs, mouth-organs, and the foot-stalk of the antenna reddish, the antennal club black, and each elytron decorated with a yellow shoulder-spot, placed immediately behind the base of the 6th and 7th intervals and sometimes divided into two.

Oval and not very convex. The *head* and *pronotum* are similarly and rather closely but moderately finely punctured with annular punctures (except near the base of the pronotum, where the punctures are distinctly larger), and not opaque. The *elytra* bear shallow and rather broad striæ composed of chains of close confluent pits, the intervals slightly convex and very finely and not very closely punctured, with a clothing

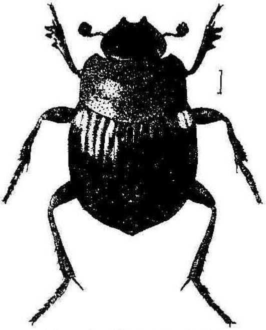

Fig. 47.—*Phacosoma lætum.*

of extremely fine and inconspicuous setæ. The *pygidium* is very convex, moderately closely punctured with fine annular punctures and clothed with very fine setæ. The *mesosternum* is very smooth, the meso-metasternal line nearly straight in front. The metasternal shield is convex and finely punctured, except in the middle, which is quite smooth, and the sides of the *metasternum* are closely punctured with annular punctures. The front tibiæ are rather broad, with the three external teeth very sharp and rather close together. The four posterior legs are rather long, the tibiæ straight, the hind tibia rather slender.

I have found no sexual difference.

Length, 4·5–5 mm.; breadth, 3 mm.

S. INDIA: Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

304. **Phacosoma cingalense**, sp. n.

Black, very smooth and shining, and without hairs or setæ, the legs, mouth-organs and foot-stalk of the antenna reddish, and the antennal club black.

Elongate-oval, not very convex. The *head* is rather finely and evenly punctured, the punctures becoming very fine and scanty anteriorly and larger behind. The *pronotum* is similarly but a little more strongly punctured, especially in its posterior part. The *elytra* are long, finely striate, the outer striæ rather strongly, and the inner ones finely and inconspicuously, punctured, and the intervals feebly convex and almost smooth. The *pygidium* is very smooth and shining, with only a few minute punctures at the sides. The *mesosternum* is very smooth, the meso-metasternal line gently rounded. The metasternal shield is very smooth and shining, and the sides of the *metasternum* bear evenly distributed elongate-oval shallow impressions. The three external teeth of the front tibia are long and not very close together. The four posterior legs are long and slender.

Length, 4·5 mm.; breadth, 3 mm.

CEYLON: Ohiya, 6500 ft. (*G. M. Henry*, April).

Type in the British Museum.

I have seen only the single example presented by Mr. Henry.

Genus PARACHORIUS.

Parachorius Har., Col. Hefte, xi, 1873, p. 103.

TYPE, *P. thomsoni* Har.

Range. North India and W. China.

Very broadly oval and convex, or almost hemispherical, almost devoid of clothing above and beneath, the legs short but not stout, the front tibia armed with three external teeth and finely serrate above them, the middle and hind tibiæ short and regularly dilating from base to extremity, but not greatly dilated at the extremity, and without lateral ridges. Front tarsi slender, middle and hind tarsi scarcely tapering, a little flattened, with the 1st joint about twice as long as the 2nd, the 2nd, 3rd, and 4th slightly diminishing, the claws minute. Head flat, strongly dilated in front of the eyes, the ocular lobes and clypeus not separated from the forehead, the clypeus sharply notched and bidentate in front, with the sides nearly straight and convergent. Prothorax very convex, its sides rounded, not angulate, the front and hind angles distinct, the latter very obtuse, the front angles a little hollowed beneath, the base nearly straight in the middle, not margined. Scutellum absent. Elytra with seven striæ and a single epipleural carina. Antenna 9-jointed. Mentum subquadrate,

hollowed beneath and shortly bilobed in front, the three joints of the palpus nearly equal in length, the two basal joints as broad as they are long. Meso-metasternal suture straight or gently curved.

These insects are very rare, and have evidently peculiar habits of some kind as yet unknown.

Key to the Species of Parachorius.

1 (4)	Surface very shining.	
2 (3)	Elytral striæ not distinctly punctured. .	*thomsoni* Har., p. 358.
3 (2)	Elytral striæ strongly punctured.	*hookeri*, sp. n., p. 359.
4 (1)	Surface entirely dull	*globosus*, sp. n., p. 360.

305. Parachorius thomsoni.

Parachorius thomsoni Har., Col. Hefte, xi, 1873, p. 103.

Black, smooth and shining, with the legs dark red and the antennæ and mouth-organs yellow.

Broadly oval and rather convex. The *head* is broad, finely punctured, fairly closely in front and less closely behind.

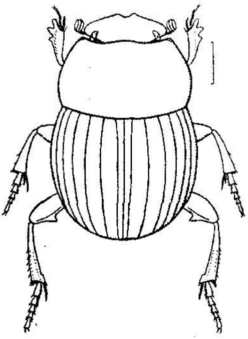

Fig. 48.—*Parachorius thomsoni*, ♂.

The *pronotum* is finely and rather evenly but not very closely punctured. The front margin is gently trisinuate, the front angles are acute and the hind angles very obtuse. The *elytra* are not very short, finely but very distinctly striate, with the striæ unpunctured, the 7th stria a little abbreviated behind, and all the intervals irregularly, finely, and not closely

punctured. The *pygidium* is fairly strongly and closely punctured, the metasternal shield very finely, sparsely, and unevenly, with a fine median carina in front, and the sides of the *metasternum* are rather strongly and closely punctured.

♂. The front and hind femora are a little dilated, the former bearing a slight sharp tooth upon its anterior edge a little before the extremity and the latter two teeth upon its posterior edge, a feeble one near the base, and a strong triangular one midway between the last and the extremity. The front tibia has a strong and sharp vertical process upon its lower face just behind the point of insertion of the tarsus and a blunt prominenee near the base.

Length, 8–9 mm. ; breadth, 5·5–5 mm.

BENGAL : Singla, Darjeeling Dist., 1500 ft. (*Lord Carmichael's collector*, June). W. CHINA : Yunnan.

Type in M. Oberthür's collection.

The actual habitat of the original specimens described by Harold is unknown, these and a male specimen in the British Museum being labelled " India Or." There is a female from Yunnan in M. Boucomont's collection.

306. **Parachorius hookeri**, sp. n.

Black, smooth and very shining, with the legs, antennæ, and mouth-organs red, the upper and lower surface entirely devoid of hairs or setæ. There is a very feeble metallic lustre upon the head and pronotum.

Very broadly oval, compact and convex. The *head* is broad, obtusely angulate at the sides, strongly punctured, rather rugosely in front and irregularly behind. The *clypeus* is narrowly notched in front, with the two lobes small, but not broad nor very blunt. The *pronotum* is finely and rather sparingly punctured in the middle and a little more strongly and closely at the sides. The lateral margins are evenly and rather strongly rounded, the front angles distinct but obtuse, the hind angles almost obsolete, and the base is almost straight in the middle. The *elytra* are deeply striate, the striæ having numerous well marked transverse or double punctures, the 7th stria a little abbreviated behind, the intervals very slightly convex and finely, irregularly, and sparingly punctured. The *pygidium* is rather strongly punctured, the metasternal shield almost unpunctured except at the margins, and the sides of the *metasternum* bear a few large annular punctures.

Length, 5·5 mm. ; breadth, 3·5 mm.

SIKKIM.

Type in the British Museum.

A single specimen of this little species, probably a female, was found by Sir Joseph Hooker during his historic collecting journey in the Himalayas, and has remained unnamed and unique for nearly eighty years. The specimen is labelled "N. India" only, but the bulk of the collection was brought from Sikkim, although a few were from the Khasi Hills.

307. **Parachorius globosus**, sp. n.

Dull black, with the antennæ, mouth-organs and tarsi red, the upper and lower surfaces entirely without hairs or setæ.

Very broadly oval and highly convex, with rather slender legs. The *head* is very broad and flat, finely and very closely punctured, with the sides very gently and evenly curved, and bluntly but strongly angulate behind, and the *clypeus* narrowly notched in front, with the two lobes small but not broad nor very blunt. The *pronotum* is similarly punctured in front and at the sides, and a little more strongly and less densely upon the dorsal part. The lateral margins are uniformly rounded, the front angles distinct but obtuse, the hind angles almost obsolete, and the base is straight in the middle. The *elytra* are extremely short and finely striate, with the intervals flat, not very finely but very closely and evenly punctured, the punctures having a central granule. The *pygidium* is punctured like the elytra, as well as the sides and hind margin of the *metasternum*, of which the shield is rather more finely and less closely punctured.

Length, 6·5 mm.; breadth, 4 mm.

BENGAL: Darjeeling, 5000 ft. (*R. W. G. Hingston*, March).

Type in the British Museum.

The type is unique and is probably a female.

Genus **CASSOLUS**.

Cassolus Sharp, Col. Hefte, xiii, 1875, p. 40; Bouc., Ann. Soc. Ent. France, lxxxiii, 1914, p. 250.

TYPE, *C. nudus* Sharp (Cambodia).

Range. Indo-Malayan Region.

Form short, compact and convex, or subhemispherical, with the middle and hind legs rather slender, the hind legs longer than the middle ones and their femora very slender at the base. Front tibia armed with three sharp oblique external teeth and minutely serrate above and between them. Front tarsi slender. Middle and hind tibiæ narrow, gently curved, only slightly dilated at the extremity, the tarsi slightly compressed, compact, the joints of equal width and not very dissimilar in length, the basal one slightly

longer than the 2nd. Antennæ 9-jointed. Head short, broad and flat, without carinæ or elevations, obtusely angulate at the sides, the clypeus rounded in front and bearing four short, sharp, slightly recurved teeth. Pronotum uniformly convex, with the sides rounded, the front angles blunt, the hind angles obsolete, and the base feebly rounded. Scutellum absent. Elytra with narrow epipleuræ and seven dorsal striæ. Front angles of the prothorax deeply hollowed beneath. Middle coxæ far apart, parallel. Mesosternum not very short, separated by a nearly straight line from the metasternum. Metasternum short and broad. Mandible rather long. Maxilla with broad outer lobe. Mentum transversely quadrate, broadly bilobed in front, the labial palpus with the 1st and 2nd joints short and the 3rd long, not minute.

Cassolus is closely related to the great New World genus *Canthon*, from which it differs only in minor details, such as the longer basal joint of the posterior tarsi.

308. **Cassolus humeralis.**

Cassolus humeralis Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 416.

Black, very smooth and shining, with the head and pronotum coppery, each elytron decorated with a small round orange

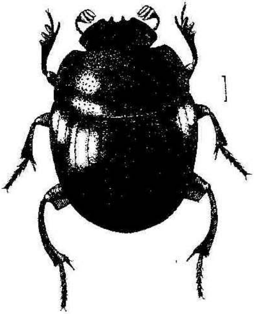

Fig. 49.—*Cassolus humeralis*, ♂.

spot at the shoulder, and the legs and antennæ (except the club) red.

Broadly oval and convex. The *head* is finely and rather closely, the *pronotum* finely but more sparsely, punctured.

The *elytra* are deeply striate, the striæ rather closely punctured and the intervals feebly convex and almost unpunctured. The *pygidium* is closely and rather strongly punctured, and the *metasternum* fairly strongly at the sides and very smooth and shining in the middle.

♂. There is a perpendicular tooth beneath the front tibia, the hind tibia is longer, more slender and more strongly curved than that of the female, and the hind femur is dilated in its apical part, the posterior flange forming an obtuse angle near the knee.

♀. The hind femur is club-shaped, narrowed and rounded at the extremity.

Length, 4–5 mm. ; breadth, 3–3·5 mm.

ASSAM : Sadiya, Patkai Hills (*W. Doherty*). BENGAL : Gopaldhara, Rungbong Valley, Darjeeling Dist., 4000 ft. (*H. Stevens*). S. INDIA : Nilgiri Hills (*H. L. Andrewes*) ; Sappal, Palghat, Madras, 1700 ft. (*J. C. M. Gardner*, May).

Type in the British Museum.

Genus LIATONGUS.

Liatongus Reitt., Verh. Ver. Brünn, xxxi, 1893, p. 166.

TYPE, *O. phanæoides* Westw.

Range. Asia, Africa, and America.

Body rather elongate in shape. Scutellum present, very small. Elytra without posterior fringe of bristles or setæ. Pygidium without a sharp ridge parallel to the base. Antennæ 8-jointed. Maxilla short, with broad terminal membranous lobe. Mentum transverse, broadly bilobed, the labial palpus with the 1st joint short, the 2nd elongate, and the 3rd extremely minute.

Liatongus has nearly all the features of *Onthophagus*, differing chiefly in the existence of a scutellum, but with this is associated a rather less abbreviated hinder portion of the body, indicated by relatively longer elytra. The prosternum is usually a little tumid behind the front coxæ, and in *L. rhadamistus* F. shows a quite unusual development. In this and the nearly related African species, *L. egregius* Klug, this part is produced into a thick, somewhat rectangular lobe, covering the junction of the meso- and metasternum, and fitting closely against the latter. An exceptional degree of rigidity appears to result from this structure in conjunction with the elongate prothorax.

The two sexes usually differ greatly. The head of the male is generally horned and often the pronotum also. In *L. vertagus* the male has a single horn and the female two upon the head.

Key to the Species of Liatongus.

1	(20)	Not very elongate; elytra not black-spotted; ♂, head horned.	
2	(5)	Metasternum densely punctured.	
3	(4)	Head strongly and uniformly punctured	*rhinoceros*, sp. n., [p. 363.
4	(3)	Head not strongly and uniformly punctured	*phanæoides* Westw., [p. 364.
5	(2)	Metasternum not densely punctured.	
6	(7)	Entirely black above and beneath ...	*gagatinus* Hope, p. 365.
7	(6)	Not entirely black above and beneath.	
8	(11)	Median groove of thorax long and rather broad.	
9	(10)	Elytral intervals very narrow	*femoratus* Ill., p. 366.
10	(9)	Elytral intervals not very narrow....	*affinis* Arrow, p. 367.
11	(8)	Median groove of thorax not long or broad.	
12	(19)	Upper surface not very opaque.	
13	(18)	Pygidium rough and opaque.	
14	(17)	Pronotum well punctured.	
15	(16)	Elytral intervals convex	*indicus* Arrow, p. 368.
16	(15)	Elytral intervals flat	*mergacerus* Hope, p. 369.
17	(14)	Pronotum very lightly punctured ...	*martialis* Har., p. 370.
18	(13)	Pygidium smooth and shining	*vertagus* F., p. 371.
19	(12)	Upper surface very opaque	*venator* F., p. 373.
20	(1)	Very elongate; elytra yellow, with black spots; ♂, head not horned..	*rhadamistus* F., p. 374.

309. **Liatongus rhinoceros**, sp. n.

Black, opaque, closely clothed above and beneath with minute pale erect setæ, absent only from the dorsal excavation of the pronotum of the male, which is shining and very feebly metallic, and from the metasternum.

Oblong in shape and not very convex. The *head* is shallowly and densely punctured, broad, bluntly angulate on each side, with the clypeal margin straight in the middle. The *pronotum* is equally densely but more coarsely punctured and has a longitudinal median groove, which is deepest at the base of the thorax. The front angles are very broadly rounded, the lateral margins are curved in front, nearly straight and converging behind, the hind angles obsolete, and the base is obtusely angular in the middle. The *elytra* are shallowly striate, the striæ forming chains of rather close and large punctures, and the intervals are flat and very closely clothed with very short but stout and almost scale-like setæ. The *pygidium* is densely covered with large shallow pits and similarly clothed, the sides of the *metasternum* are similarly pitted, and the middle rather less closely, without distinct clothing of setæ. There is a large depression upon the posterior part of the metasternum.

♂. There is a long, slender, erect horn upon the middle of the front margin of the clypeus, and the anterior half of the pronotum bears a deep excavation continued by a broad groove

to the base. The sides of the cavity are strongly elevated and produced obliquely forward and upward as a pair of long, slightly curved and flattened horns, converging a little to the tips, which are blunt.

♀. The horns of head and thorax are absent, but the pronotum has a pair of strong longitudinal tubercles placed on each side of the median groove just behind the front margin.

Length, 7 mm. ; breadth, 4 mm.

PUNJAB: Simla. BENGAL: Kurseong, Darjeeling Dist., 5000 ft.

Type in the British Museum.

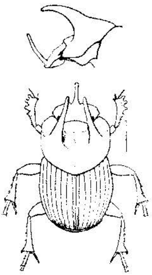

Fig. 50.—*Liatongus rhinoceros*, ♂, and profile of head and thorax.

This remarkable insect is entirely unlike any other Indian species, but is evidently related to certain African members of the genus, and especially to the Abyssinian *L. tuberculicollis* Felsche.

310. **Liatongus phanæoides.**

Onthophagus phanæoides Westw., Royle's Himalaya, 1840, Entomology, p. 55, pl. 9, fig. 3.
Onthophagus excavatus Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 523.
Phanæus minutus Motsch., Études Entom. ix, 1860, p. 13.

Black or chocolate-brown, sometimes with the elytra paler than the head and thorax, the femora red or bright yellow. The upper surface, pygidium, abdomen, and sides of the metasternum are opaque.

Oval in shape and a little flattened above. The *head* is finely and closely punctured, with the front margin reflexed and slightly truncate or feebly excised. The *pronotum* is coarsely, densely, and in parts rugosely, punctured, with a broad

shallow depression along the middle. The lateral margins converge to the front and rear, the front angles are not very sharp, the hind angles almost obsolete, and the base is obtusely angulate in the middle. The *elytra* are very finely striate, with the intervals flat, unpunctured, but with minute scattered granules. The *pygidium* and abdomen beneath are also unpunctured, the metasternal shield is closely punctured but shining and has a strong median furrow, and the sides of the *metasternum* are opaque and asperate.

♂. The head is armed with a strong horn arising between the eyes, directed backward, strongly curved, and extending beyond the base of the pronotum in well developed specimens. It is flattened beneath, acutely pointed at the tip, and has a small tooth beneath placed just before the tip and directed backward, and another small tooth on each side just before the last. The dorsal depression of the pronotum occupies most of its surface, its lateral margins are carinate, and in well developed specimens the basal margin of the depression also is carinate, and there is a strongly elevated tubercle at the junction of the basal and lateral margins and a minute median tubercle just behind the front margin. The front tibia is well curved and armed with rather short teeth.

In small males the horn is short and without teeth and the thoracic depression is narrower, without a defined posterior margin or tubercles.

♀. The head bears two minute tubercles close together at the hind margin. The thoracic depression occupies less than one-third of the width, extends to the base, and its lateral margins are not sharply carinate. The front tibia is armed with long acute teeth and not much curved.

Length, 7–11 mm. ; breadth, 4–6·5 mm.

PUNJAB : Gharial, Murree Subdiv., 6000 ft. (*H. S. Pruthi*, Sept.). U. PROV. : Mussoorie, 6000–7000 ft. (*J. C. M. Gardner*, June ; *Col. Harcourt*, July ; *C. F. C. Beeson*, Aug.). BENGAL : Calcutta (*Col. Buckley*). BURMA : Ruby Mines (*W. Doherty*). INDO-CHINA. S. CHINA. JAPAN.

Type in the Hope Department, Oxford University Museum ; that of *excavatus* Redt. in the Vienna Museum.

311. **Liatongus gagatinus.** (Plate XII, figs. 11, 12.)

Liatongus gagatinus Hope,* Gray's Zool. Misc. 1831, p. 22.
Onthophagus brama Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 521.

Black, generally with the legs and lower surface reddish-black, the head and prothorax shining, and the elytra and abdomen subopaque. The outer margins of the pygidium and abdomen are red.

Broadly oblong, moderately convex, with the upper surface quite, and the lower surface almost, devoid of hairs or setæ.

The *clypeus* is finely punctured, its front margin reflexed and almost imperceptibly excised in the middle. The forehead is very smooth and shining. The anterior part of the *pronotum* is retuse in the middle and a little hollowed on each side, the front and sides are rather feebly punctured, and the middle and base strongly and closely, and there is a longitudinal depression in the posterior part. The prothorax is broad in front, with the front angles very blunt, the sides a little contracted behind, and the base very obtusely angulate in the middle. The *elytra* are short, deeply sulcate, with the intervals convex, microscopically sculptured and minutely and sparsely punctured. The *pygidium* is opaque and feebly punctured, and the *metasternum* is very smooth and shining in the middle, opaque and granulate at the sides.

♂. The clypeus is short, shining, and feebly punctured, divided from the forehead by a sharp carina. The posterior carina is dilated and produced at the angles into a pair of short diverging horns, curving backward a little. The thoracic hump has a sharply carinate anterior edge, and is distinctly though obtusely angulate in the middle.

♀. The clypeus is longer and more distinctly punctured, the anterior carina is more elevated and less curved, and the posterior carina is not produced at the angles. The thoracic hump has a rather less sharply carinate anterior edge, and its outer angles are generally a little more pronounced.

Length, 9–15 mm.; breadth, 5–9 mm.

NEPAL (*Maj.-Gen. Hardwicke*). SIKKIM: Gantok, 5000 ft. (*R. W. G. Hingston*, May). U. PROV.: W. Almora, Kumaon Div. (*H. G. Champion*, June); Muktesar, 7500 ft. (Sept.); Mussoorie (*O. C. Ollenbach*, June); Dehra Dun (*O. C. Ollenbach*, July). ASSAM: Shillong, 5000 ft. (*T. Bainbrigge Fletcher*, April, May, June, July); Naga Hills (*W. Doherty*); Haflong, Cachar Dist. (*C. F. C. Beeson*, May). BENGAL: Kurseong, Darjeeling Dist., 6000 ft. (*E. A. D'Abreu*, Aug.). BURMA: Kachin Cauri (*L. Fea*, Aug., Nov.); Asciuii Cheba, Karen Hills, 3600–3900 ft. (*L. Fea*, Jan.).

Type in the British Museum; that of *brama* Redt. in the Vienna Museum.

312. Liatongus femoratus.

Copris femoratus Ill., Wiedem. Arch. Nat. i, 2, 1800, p. 108.
Copris bidens Weber, Obs. Ent. 1801, p. 36.
Onitis niger Wied., Zool. Mag. i, 3, 1819, p. 159.

Black, with the lower surface, antennæ, femora, and the anterior part of the lateral margins of the pronotum orange-yellow. The head, the anterior part of the pronotum, and the legs are shining.

Elongate-oval, not very convex. The *clypeus* is finely punctured, its front margin nearly straight, and the head

bears two short transverse carinæ, the posterior one more or less elevated at each end. The *pronotum* has a longitudinal median groove dilating a little to the hind margin, and is rather strongly and closely punctured in the groove and upon its basal part. The front margin falls rather steeply behind the head. The sides are bisinuate and the base is angulate in the middle. The *elytra* are finely striate, with the intervals convex, shining in the middle, where they are minutely and sparsely punctured, and coriaceous and opaque at the sides. The *pygidium* and abdomen are also coriaceous and opaque, the metasternal shield is finely punctured and has a deep median longitudinal groove, and the sides of the *metasternum* are granular. The front angles of the prothorax are hollowed and rugosely punctured beneath.

♂. In well developed males there is a broader frontal carina upon the head than in the female, and the posterior carina forms two prominent rounded lobes.

Length, 7–9·5 mm.; breadth, 3·5–5 mm.

TENASSERIM (*Helfer*). SIAM. MALAY PENINSULA. SUMATRA. JAVA.

Type in the Berlin Zoological Museum.

313. **Liatongus affinis.**

Oniticellus affinis Arrow, Ann. Mag. Nat. Hist. (8) i, 1908, p. 181.

Black or very dark blackish-brown, with the head coppery or dark metallic green, and the legs and lower surface (chiefly), the anterior part of the outer margin of the pronotum, the extreme outer margins of the elytra, and the antennæ orange-yellow. The tibiæ are brown above. The head, the anterior part of the pronotum, and the legs are shining.

Elongate-oval and not very convex. The *clypeus* is moderately punctured, with its sides straight and convergent and the front margin gently rounded. The *pronotum* has a median longitudinal groove, except in its anterior part, and is rather strongly and closely punctured, except in front. The sides are strongly bisinuate and the base is angular in the middle. The *elytra* are rather broadly sulcate, with the sulci opaque and the intervals convex and finely and irregularly punctured and rugulose. The *pygidium* and abdomen are coriaceous, the sides of the *metasternum* bear fine granules, and the metasternal shield is finely punctured and has a median longitudinal groove. The prothorax is a little hollowed and well punctured beneath the front angles.

♂. The head bears a broad transverse frontal carina, which dilates from base to summit, the angles forming a pair of sharp-pointed strongly divergent processes, curving slightly upward. The front angles of the pronotum are rounded and rather smooth, the middle of the anterior declivity is almost vertical,

and the dorsal part is slightly produced in the middle, terminating in two small tubercles only a little separated.

♀. The head bears two transverse carinæ, the anterior one slightly curved and the posterior straight. The front angles of the pronotum are pointed and strongly punctured, and there is a very slight dorsal prominence with a nearly vertical but very short declivity in the middle of the front margin.

Length, 7·5–9·5 mm. ; breadth, 4·5–5·5 mm.

BENGAL : Singla, Darjeeling Dist., 1500 ft. (June). ASSAM : Manipur (*W. Doherty*). BURMA : Momeik (*W. Doherty*) ; Shwegu-Myo (*L. Fea*, Oct.) ; Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.) ; Asciuii Cheba, 3600–3900 ft. (*L. Fea*, Jan.) ; Ghecu, 3900–4200 ft. (*L. Fea*, March) ; Tavoy. SIAM. INDO-CHINA.

Type in the British Museum.

The dorsal prominence of the male, which is broad in *L. indicus*, narrows in front in this species, the two slight anterior cusps being close together. In a variety which I describe here the cusps are absent.

Var. **capricornis**, *nov.*

A series of four males differ conspicuously from the typical form in having the frontal carina narrower and its produced angles not widely divergent but drawn vertically upward, almost parallel, and rather more slender than in the other phase. The thoracic prominence also is rather narrower and more produced, with an obtusely pointed apex—not two-cusped as in the typical form. I have found no difference in the females, and therefore treat this form as a local race and not as a distinct species.

BURMA : Tharrawaddy (*G. Q. Corbett*) ; Palon, Pegu Div. (*L. Fea*, Aug., Sept.).

Length, 8–9 mm. ; breadth, 4·5–5 mm.

314. **Liatongus indicus.**

Oniticellus indicus Arrow, Ann. Mag. Nat. Hist. (8) i, 1908, p. 180.

Black, with the posterior part of the head and the anterior part of the pronotum usually coppery, and the anterior part of the outer margin of the pronotum, the external and apical margins of the elytra, the antennæ and the greater part of the legs, lower surface, and pygidium yellow. The tibiæ are brown. The head and pronotum are rather shining, and the elytra, pygidium, abdomen, and sides of the metasternum are opaque.

Oval, not very convex. The sides of the *head* are straight and convergent, the front margin nearly straight, the *clypeus* finely punctured. The *pronotum* has a median longitudinal groove, and is strongly and fairly closely punctured, except

in its anterior part. The sides are bisinuate and the base angulate in the middle. The *elytra* are deeply sulcate, with the intervals convex and finely irregularly punctured and rugulose. The *pygidium* and abdomen are coriaceous, the metasternal shield is finely punctured and has a median longitudinal groove, and the sides of the *metasternum* bear fine granules.

♂. There is a short straight clypeal carina and a broad posterior one, which dilates from the base upward and is a little produced at the angles. The anterior part of the pronotum is very smooth, nearly vertical in the middle and excavated on each side, the top of the declivity forming a broad ridge slightly tuberculate at each end.

♀. The head bears two transverse carinæ, the anterior one slightly curved and the posterior straight. The pronotum has a slight dorsal prominence, with a short, nearly vertical declivity, which is feebly punctured.

Length, 8–10·5 mm.; breadth, 5–6 mm.

S. INDIA: Nilgiri Hills (*H. L. Andrewes*); Anaimalai Hills, 3000–6000 ft.

Type in the British Museum.

315. Liatongus mergacerus.

Onthophagus mergacerus Hope, Gray's Zool. Misc. 1831, p. 22.
Oniticellus mergacerus Har., Col. Hefte, xii, 1874, p. 94.

Brown, with a slight coppery or metallic green lustre upon the upper surface, and with the clypeus, the anterior part of the lateral margin of the pronotum broadly, the outer margins or all but the sutural margins of the elytra, the pygidium partly or entirely, the femora and parts of the lower surface, yellow.

Oval, not very shining, except upon the head and anterior part of the pronotum. The *clypeus* is finely punctured, with its front margin nearly straight or very feebly excised, and separated from the forehead by a feebly curved carina. The *pronotum* is fairly closely punctured upon its posterior part, completely margined at the sides and base, and has a short but very deep longitudinal impression at the middle of the base. The sides are strongly bisinuate, the front angles blunt and the hind angles wanting. The *elytra* are lightly striate, the striæ containing minute, rather indistinct punctures, the intervals opaque and very minutely punctured. The *pygidium* also is opaque and very minutely punctured. The metasternal shield is almost entirely smooth, with a fine median groove, and the sides of the *metasternum* are very finely and sparsely punctured. The front tibia is gently curved and armed with four strong lateral teeth.

♂. The forehead bears a horn, erect at the base and rather broadly transverse, then curving strongly backward and dividing into two slender, sharp-pointed, not very strongly divergent branches. The pronotum is very deeply and broadly excavated in its anterior part, with the cavity very smooth and shining, and its posterior margin produced forward and a little upward in the middle as a strongly compressed straight blade-like dorsal horn, rounded at the tip. The terminal spur of the front tibia is rather clavate.

In males of small development the head bears only a more or less rectangular lamina produced at its upper angles, and the thorax is little or not at all hollowed and armed only with a slight blunt prominence.

♀. The head hears two strong transverse carinæ, the anterior one gently curved and the posterior straight. The pronotum has a short rounded or very obtusely pointed dorsal hump, with a short, nearly vertical declivity, and a small lateral tooth on each side at a little distance from the dorsal hump. The front tibia is broad and the terminal spur is not clavate.

Length, 7·5–9 mm. ; breadth, 4·5–5 mm.

NEPAL : Soondrijal. BHUTAN : Pedong (*L. Durel*). SIKKIM : Kalimpong, 4000 ft. (*R. W. G. Hingston*, Mar.) ; Maria Basti (*L. Durel*) ; Gopaldhara, Rungbong Valley (*H. Stevens*). BENGAL : Sukna, 500 ft. (Jan.) ; Singla, 1500 ft. (June) ; Soom, Darjeeling Dist., 4000–5000 ft. (July). U. PROV. : W. Almora (*H. G. Champion*, June, Aug.) ; Ranikhet (*H. G. Champion*, June).

Type in the British Museum.

316. **Liatongus martialis.**

Oniticellus martialis Har., Col. Hefte, xvi, 1879, p. 227.

Metallic greenish-black, not very shining, with the femora, parts of the lower surface, the pygidium, an inconspicuous lateral patch at the outer margin of the pronotum, and the apical and extreme lateral margins of the elytra orange-yellow.

Broadly oval and convex. The *head* is rather finely and closely punctured, with the front margin rounded and entire. The *pronotum* is finely and unevenly punctured, with the front angles strongly produced but blunt. The *elytra* are rather strongly striate, with transverse, not very close nor deep punctures in the striæ, the intervals rather convex and finely but not closely punctured. The *pygidium* is finely rugose and opaque, the lower surface smooth, with the metasternal shield very finely and sparsely punctured and finely longitudinally channelled along the middle, and the sides of the *metasternum* are finely granular.

♂. The head bears a long slender recurved horn, arising

between the eyes. The pronotum slopes strongly from the front to the middle, and bears a small tubercle in the middle and a short longitudinal carina on each side of it and at a short

Fig. 51.—*Liatongus martialis*, ♂, and side view of head and thorax.

distance from it. The sides are a little elevated in the middle and form a short bilobed carina on each side.

I do not know the female.

Length, 11 mm.; breadth, 6 mm.

BURMA.

I am indebted to M. René Oberthür for allowing me to examine the unique type from his collection.

317. **Liatongus vertagus.** (Plate XII, figs. 1, 2, 3.)

Copris vertagus F.,* Ent. Syst., Suppl. 1798, p. 30.
Oniticellus bifurcatus Er., Nova Acta Leop.-Carol. xvi, Suppl. 1834, p. 235, pl. 37, fig. 4.
Onthophagus bifurcalis White,* Ann. Mag. Nat. Hist. xiv, 1844, p. 423.
Onthophagus dichrous Boh.,* Eugen. Resa, 1858, p. 43.
Oniticellus pictisternum Fairm.,* Bull. Soc. Ent. Belg. xxxv, 1891, p. 193.
Oniticellus tonkineus id.,* Ann. Soc. Ent. Belg. xxxvii, 1893, p. 305.
Oniticellus vertagus Arrow, Ann. Mag. Nat. Hist. (8) i, 1908, p. 180.

Chocolate-brown, usually with the anterior lateral margins of the pronotum and the elytra paler and the pygidium,

lower surface and femora yellowish, the upper surface suffused with a slight coppery or greenish metallic lustre.

Oval, subopaque, with the head and lower surface shining. The *clypeus* has the sides convergent and the front margin nearly straight or feebly excised. The *pronotum* is finely and moderately closely punctured, with the front margin smooth or almost smooth, and with a median longitudinal groove, very deeply impressed behind, upon its posterior half. The lateral margins are feebly curved in front and sinuate behind, the front angles are moderately sharp, the hind angles obsolete, and the base is distinctly angulate in the middle. The *elytra* are lightly striate, the striæ feebly punctured, the intervals coriaceous and scarcely visibly punctured, the 3rd, 5th, and 7th usually a little more elevated than the rest. The *pygidium* bears a few minute scattered punctures. The metasternal shield is very smooth, minutely and sparsely punctured, and the sides of the *metasternum* are finely and irregularly granulate.

♂. The clypeus is shining and rather finely punctured, its anterior part usually yellow. The forehead bears a strongly recurved transversely placed horn, broad at the base, narrowed a little and strongly bifurcate at the end. The pronotum is produced forward and a little upward just before the middle, forming a narrow process, slightly bifurcate at the tip. The front tibiæ are curved and rather slender, with four not very sharp teeth, and the terminal spur is a little clubbed at the end.

In large males the cephalic horn is long and rather triangular in section, and the thoracic horn is compressed and distinctly dilated and bifid at the tip. In minor males the cephalic horn forms a short, rectangular, erect lamina sharply produced at its free angles, and the thoracic process is short and not compressed. In very small males the head bears only two slight, broad, transverse carinæ, and the pronotum a feeble anterior prominence.

♀. The clypeus is longer than that of the male and has a rugosely punctured margin and two transverse carinæ, the posterior one sharply produced at its upper angles. The pronotum is almost vertical in the middle of the front margin and has a broad rounded dorsal prominence. The teeth of the front tibia are long and sharp.

In well developed specimens there is a sharp lateral tooth on each side of the dorsal prominence. In minor females the frontal carina is without produced angles and there are no lateral teeth upon the dorsal prominence.

Length, 7·5–11 mm.; hreadth, 4·5–6 mm.

ASSAM: Cachar (*C. F. C. Beeson*, May); Manipur (*W. Doherty*). BURMA: Shwegu-Myo (*L. Fea*, Oct.); Cheba, Karen Hills, 1500–3000 ft. (*L. Fea*, Dec.); Ghecu, Karen Hills, 3900–4200 ft. (*L. Fea*, Feb., Mar.); Asciuii Cheba, 3600–

3900 ft. (*L. Fea*, Dec., Jan.) ; Ruby Mines (*W. Doherty*). INDO-CHINA. S. CHINA.

Type in the Copenhagen Museum ; that of *bifurcalis* White in the British Museum ; that of *dichrous* Boh. in the Stockholm Museum, and those of Fairmaire in the Paris Museum.

318. **Liatongus venator.**

Copris venator F., Syst. Eleuth. i, 1801, p. 41.
Oniticellus venator Bouc., Vitalis, Faune Ent. de l'Indoch. 1921, p. 22.

Dark chocolate-brown, opaque above, with the greater part of the head, the anterior part of the lateral margins of the pronotum, and the greater part of the legs, pygidium, and lower surface yellow. The antennæ, mouth-organs, and hairy clothing (extremely minute and inconspicuous upon the upper and lower surfaces) are also pale.

Elongate-oval and moderately convex. The *clypeus* is finely punctured, its front margin feebly excised, its sides convergent and nearly straight, and the ocular lobes rather prominent in front. The *pronotum* is closely and not very finely punctured, with its anterior region smooth in the male, the median part produced in front and rather strongly channelled behind. The front angles are more or less produced, the lateral margins straight or feebly angulate in front and slightly sinuate behind, the hind angles entirely obsolete, and the base obtusely angulate in the middle. The *elytra* are striate, the intervals slightly convex and coriaceous. The *pygidium* is flat, opaque, and finely rugose. The metasternal shield is shining and rather uniformly punctured, with a strong median groove, and the sides of the *metasternum* are granular and opaque.

♂. The clypeus is shining and the head bears a strong erect horn, flattened in front and behind, curving backward, and bifurcate at the end. The anterior dorsal part of the pronotum is produced obliquely forward and upward, forming a straight sharp-pointed horn, which meets the cephalic horn. The pronotum is very smooth and shining in front of the dorsal horn and the front angles are acutely produced. The front tibia is narrow, strongly curved, and armed with four sharp teeth.

♀. The clypeus is closely punctured and opaque and separated from the forehead by a very strong curved carina. The vertex bears a strong erect transverse ridge, with its angles sharply pointed. The anterior dorsal part of the pronotum is a little produced. The front tibia is broad and armed with four blunt teeth.

Length, 7·5–9 mm. ; breadth, 4–5 mm.

TENASSERIM (*Helfer*). INDO-CHINA. JAVA. LOMBOK.

Type in the Paris Museum.

319. Liatongus rhadamistus. (Plate I, fig. 10.)

Scarabæus rhadamistus F., Syst. Ent. 1775, p. 22; Oliv., Ent. i, 3, 1789, p. 185, pl. 28, fig. 243.

Bright orange-yellow, with the head partly or entirely, the pronotum, except the lateral margins, the basal and sutural margins of the elytra, a spot common to both elytra upon the middle of the suture, one upon the shoulder, one before the middle and one behind the middle of the 5th interval, bluish- or greenish-black. The posterior half of the pygidium, the sterna, and abdomen (except the lateral margins), and the tibiæ and tarsi are of the same dark colour. There is a slight metallic golden lustre at the sides of the pronotum.

Elongate-oval, a little flattened above, very smooth and shining. The *head* is almost semicircular in shape, but with a very slight prominence on each side of the middle of the front margin. There is a flattened rhomboidal area between the eyes. The *prothorax* is about as long as it is wide and has the front angles very blunt, the sides nearly straight to beyond the middle, where they are strongly dilated. The *elytra* are deeply striate, with the striæ very indistinctly punctured, the intervals slightly convex and very minutely and lightly punctured. The *pygidium* is finely but a little more distinctly punctured. The *prosternum* has a large posterior process covering the junction of the meso- and metasternum. The *metasternum* is very smooth, with the sides rather strongly and the anterior angles densely punctured.

♂. The clypeus is a rosy-golden colour and finely and lightly punctured, and there is a subangular frontal carina uniting the lateral sutures. The pronotum is a little longer than it is wide, and has a deep excavation extending almost for its entire length, open behind, but with its front and lateral margins raised into a continuous sharp carina. The outer margins are nearly straight and diverge a little forward, and the front margin is produced in the middle into a rather sharp backwardly curved hook. The sides are almost perpendicular, and are strongly angular beyond the middle.

♀. The head is transversely rugose and bears a slight median tubercle in the place of the carina of the male. The pronotum is a little wider than it is long, its lateral margins are strongly rounded but not angular beyond the middle, and there is a median groove, which dilates into a slight triangular depression, in the posterior half.

Length, 11–15 mm.; breadth, 5·5–8·5 mm.

C. INDIA: Jaithari Range, Umaria; Dhanpuri, Rewah State (*C. F. C. Beeson*, Nov.); Harra, Koilari, Khetgaon, 2650 ft., Pharisamer Hills, Rewah State (*H. S. Pruthi*, Feb., Mar.). C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, June); Supkhar, 2629 ft., Balaghat Dist. (*E. A. D'Abreu*, Jan.). S. INDIA:

Coimbatore (Jan., June, Sept.). CEYLON : Kandy (*G. Lewis*, Aug.) ; Hambantota (*T. Bainbrigge Fletcher*, Feb.).

Type in the Copenhagen Museum.

"On cow-dung."

This has been taken in great numbers by Mr. Hem Singh Pruthi and others. Its remarkably vivid colouring renders it unmistakable.

Genus **ONITICELLUS**.

Oniticellus Serv., Encycl. Méth. x, 1825, p. 356; Lacord., Gen. Col. iii, 1856, p. 110; Reitt., Verh. Ver. Brünn, xxxi, 1893, p. 165.

Tiniocellus Pér., Trans. S. Afr. Phil. Soc. xii, 1901, p. 116. (Type, *O. spinipes* Roth.)

TYPE, *Scarabæus cinctus* F.

Range. Europe, Asia, and Africa.

Body elongate in shape. Scutellum present. Elytra rather flat, not completely covering the abdomen and met-episterna at the sides, and bearing a fringe of stiff hairs just before the hind margin. Head short and broad. Prosternum extending a little behind the front coxæ and sometimes rather tumid there (*O. pallens* and *O. pallipes*). Metasternum very long. Middle coxæ not very long, diverging a little behind. Abdomen strongly carinate at the sides. Legs fairly stout, the middle and hind tibiæ moderately broad at the extremity, the tarsi with the basal joint much longer than the 2nd. Antennæ 8-jointed.

The two sexes are alike in their general form, the males being without any well-marked armature. In *O. pallens* and *O. pallipes*, however, the clypeus, in addition to the ridge dividing it from the forehead, bears in the male two strong ridges which are absent in the female. In *O. pallipes* the female has instead a strong tubercle upon the clypeo-frontal carina, a very exceptional feature.

Key to the Species of Oniticellus.

1 (4)	Head bearing one or more transverse carinæ.	
2 (3)	Pronotum sparingly punctured	*pallipes* F., p. 375.
3 (2)	Pronotum closely punctured	*pallens* Oliv., p. 377.
4 (1)	Head without carinæ.	
5 (6)	Upper surface opaque	*spinipes* Roth, p. 378.
6 (5)	Upper surface very smooth and shining.	*cinctus* F., p. 379.

320. **Oniticellus pallipes.**

Scarabæus pallipes F.,* Spec. Ins. i, 1781, p. 33.

Oniticellus pallipes Arrow, Ann. Mag. Nat. Hist. (8) i, 1908, p. 179.

Orange or yellow, speckled with black or brown, usually with a feeble metallic greenish or pinkish suffusion. The

clypeal margin and cephalic carinæ, a spot a little behind the front margin of the pronotum in the middle, a similar one on each side of the last, one on each side of the middle and another in the same line near the outer margin, and a pair near the middle of the base, the base and a median spot upon the pygidium, the exposed upper margins of the abdominal segments, the front tibial teeth, and the tarsi are dark-coloured.

Narrowly elongate, subopaque except upon the head, the front of the pronotum, and the small dark spots enumerated above. The front margin of the *clypeus* is straight or very feebly excised, the ocular lobes form blunt prominences, and the vertex of the *head* is hollowed and very finely and sparsely punctured. The *pronotum* is fairly strongly punctured, but less so in the middle, where there is a slight posterior

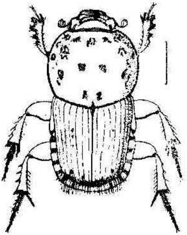

Fig. 52.—*Oniticellus pallipes*, ♂.

median groove. The front angles are almost rectangular, the sides are strongly rounded in the middle, and the base is distinctly angulate in the middle. The *elytra* are finely striate, the intervals a little convex, coriaceous, finely and sparingly punctured. The *pygidium* is opaque, impressed at the apex, and finely and sparingly punctured. The metasternal shield is finely and sparsely punctured, and the sides of the *metasternum* are feebly rugose.

♂. The front margin of the clypeus is thickened, flat and very broad, especially in the middle. There is a strong curved carina between clypeus and forehead and an angular carina just behind it. The prothorax is a little longer and more convex than that of the female. The front tibia is less broad and has sharper but shorter teeth.

♀. The clypeus is finely rugose and divided from the forehead by a carina elevated in the middle into a short broad horn.

The pronotum is strongly transverse. The front tibia is very broad and armed with four very strong teeth.

Length, 6·5–9 mm. ; breadth, 3–4·5 mm.

KASHMIR : Hutmara, Lidar Valley, 6000 ft. (*C. F. C. Beeson*, June). U. PROV. : Arakot, Chakrata, 4000 ft. (*B. M. Bhatia*, June) ; Ghazipur (*C. F. C. Beeson*, Nov.) ; Jhajra, Dehra Dun (*C. F. C. Beeson*, Oct.) ; Sitapur (*H. G. Champion*, July) ; Fyzabad (*R. W. G. Hingston*) ; Suswa R. (*C. F. C. Beeson*, Nov.). BENGAL : Calcutta (*MacClelland*) ; Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May). BOMBAY : Bombay City (*L. Fea*). S. INDIA : Madras City (*M. O. T. Iyengar*, April) ; Nilambur (*C. F. C. Beeson*, Aug.) ; Kodaikanal (*J. Castets*).

Type in the British Museum.

Found in cattle-dung.

321. **Oniticellus pallens.**

Scarabœus pallens Oliv., Ent. i, 3, 1789, p. 170, pl. 33, fig. 203.

Orange or yellow, speckled with black or brown, or brown with yellow tracery, usually with a feeble metallic pinkish or greenish suffusion, most apparent upon the head. The cephalic carinæ and clypeal margin, five patches just behind the front margin of the pronotum, a triangular spot on each side of the middle, a pair of spots near the middle of the base, rather indefinite markings upon the elytra, the exposed upper margins of the abdominal segments, and a median spot upon the pygidium, the margins of the front tibia, and the tarsi are black or brown.

Rather narrowly elongate, opaque above except upon the head and the four median and basal spots of the pronotum. The front margin of the *clypeus* is straight or very feebly excised, the ocular lobes are slightly prominent, and the vertex is hollowed and finely punctured. The *pronotum* is rather closely punctured, with the four dark spots just mentioned smooth and shining. The front angles are nearly rectangular. The lateral margins are strongly bent in the middle and the base is obtusely angulate in the middle. The *elytra* are lightly striate, with the intervals feebly convex, coriaceous, and minutely and sparsely punctured. The *pygidium* is opaque and minutely setose, with the median black spot smooth and shining. The metasternal shield is finely and closely punctured and the sides of the *metasternum* are rugose externally and sparingly punctured behind the middle coxæ.

♂. The clypeus is shining, with its front margin thickened, and is divided transversely by a strongly curved broad carina. A shorter and slighter carina separates the clypeus from the forehead. The prothorax is rather longer and more convex

than that of the female. The front tibia is broad and armed with four not very stout external teeth.

♀. The clypeus is flat and finely and rugosely punctured. The front tibia is armed with four stout external teeth.

Length, 6·5–8·5 mm.; breadth, 3–4·5 mm.

N.W. FRONTIER PROV.: Bannu (*Dr. Pennell*). SIND. ARABIA. EGYPT. SOMALILAND. ALGERIA.

Type ? in the Paris Museum.

322. **Oniticellus spinipes.**

Oniticellus spinipes Roth, Arch. f. Nat. xvii, i, 1851, p. 128.
Tiniocellus spinipes Pér., Trans. Phil. Soc. S. Afr. xii, 1900, p. 116.
Oniticellus imbellis Bates, Entom. xxiv, 1891, Suppl. p. 13.
Oniticellus modestus Arrow, Ann. Mag. Nat. Hist. (8) i, 1908, p. 182.

Opaque dark brown, with the legs and the middle of the metasternum shining, the head slightly coppery, the pronotum sometimes very feebly metallic, its margins and parts of the elytra vaguely reddish.

Elongate-oval, very flat above. The *head* is without carinæ or elevation, slightly shining in front and rugose behind, with rather deep and moderately large punctures sparsely scattered in front and more closely behind. The *clypeus* is feebly emarginate in the middle. The *pronotum* is densely and subrugosely punctured, with an impressed longitudinal line upon the basal half, rather deep behind. The sides are strongly rounded considerably before the middle, nearly straight from the middle, the front angles blunt, the hind angles obsolete and the base gently rounded. The *elytra* are finely striate, the intervals flat and minutely granulate. The *pygidium* is thinly setose and a little hollowed at the apex and on each side of the base. The *metasternum* is opaque and sparsely granulate at the sides, and the shield is shining, punctured at the sides, and smooth in the middle, with a depression behind.

♂. The clypeus is short, with its margin rounded and extremely feebly excised in the middle. The front tibia is broad, with four short sharp external teeth almost at right angles.

♀. The clypeus is slightly produced and distinctly excised at the front margin. The front tibia is broad, with very strong external teeth, the terminal one very oblique.

Length, 5·5–7·5 mm.; breadth, 3–4 mm.

PUNJAB: Kangra (*Ribbe*). U. PROV.: W. Almora (*H. G. Champion*, May, Aug.); Sitapur (*H. G. Champion*, July); Dehra Dun (*Col. Harcourt*, Oct.); Kemti Falls, Mussoorie (*M. Cameron*, May). C. INDIA: Amarkantak, Umaria, Rewah State, 3200 ft. (*C. F. C. Beeson*, Nov.). C. PROV.: Nagpur, 1000 ft. (*E. A. D'Abreu*, April, June, Aug.). BOMBAY:

Belgaum (*H. E. Andrewes*). MADRAS: Calicut; Nilambur (*C. F. C. Beeson*, Aug.). ABYSSINIA. UGANDA. W. AFRICA. E. AFRICA. RHODESIA. TRANSVAAL.

Type in the Munich University Museum; that of *imbellis* Bates in M. René Oberthür's collection; that of *modestus* Arrow in the British Museum.

323. **Oniticellus cinctus.**

Scarabæus cinctus F., Syst. Ent. 1775, p. 30.

Smooth, shining black, the head usually with a slight metallic green lustre and each elytron with a pale yellow external border extending from behind the shoulder to the sutural angle. The pygidium is generally yellowish at the base and apex.

Oblong-oval, not very convex. The *head* is moderately shining, unpunctured, and without carinæ or elevations, the *clypeus* short, with a slight depression just behind the middle of the front margin, which is rounded and gently excised in the middle. The *pronotum* is very smooth and unpunctured, with a rather deeply impressed median longitudinal line upon its posterior half. The sides are strongly rounded before the middle, nearly straight in front and behind, with the front angles rounded and the hind angles almost obsolete. The *elytra* are deeply striate, the striæ finely and closely punctured, and the intervals convex and very minutely and sparingly punctured. The *pygidium* is finely rugose and opaque. The metasternal shield is very smooth, with a fine longitudinal median stria, and the sides of the *metasternum* are rugose.

♂. The clypeus is extremely feebly excised in the middle of its front edge. The front tibia is produced at the extremity into a broad, blunt, and slightly hooked process. The four external teeth are short and placed almost at right angles to the tibia. The pygidium is a little longer than in the female.

♀. The clypeal margin is a little more deeply excised than that of the male. The front tibia is not produced at the extremity, and the external teeth are longer and stouter, the terminal one distinctly oblique.

Length, 8–11 mm.; breadth, 4·5–6 mm.

U. PROV.: Dehra Dun (*J. C. M. Gardner*, Feb.; *C. F. C. Beeson*, June); W. Almora (*H. G. Champion*, Aug., Oct.). C. PROV.: Amarkantak, Rewah State, 3300 ft. (*H. S. Pruthi*, Jan.); Nagpur, 1000 ft. (*E. A. D'Abreu*, May). S. INDIA: Mysore; Nilgiri Hills. BENGAL: Calcutta; Sukna, 500 ft. (*B. N. Chopra*, Mar.); Singla, Darjeeling Dist., 1500 ft. (June); Maini Mukh, Chittagong Hill Tracts (*R. P. Mullins*); Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May). ASSAM:

Srimangal, Sylhet Dist. (*C. F. C. Beeson*, May); Haflong, Cachar Dist. (*C. F. C. Beeson*, May). BURMA: Palon, Pegu Div. (*L. Fea*, Aug., Sept.); Asciuii Ghecu, Karen Hills, 4200–4500 ft. (*L. Fea*, Mar., April). MALAY PENINSULA. SIAM. ANNAM. S. CHINA.

Type ? in the Hope Dept., Oxford University Museum.

This species is sometimes found in very large numbers. Mr. Gardner has described and figured the larva of this species (see fig. 1, p. 4) in Indian Forest Records, xiv, 1929, p. 27, pl. 6.

Genus **DREPANOCERUS.**

Drepanocerus Kirby, Zool. Journ. iii, 1828, p. 521; Lacord., Gen. Col. iii, 1856, p. 111.
Ixodina Roth, Arch. Nat. xvii, 1851, 1, p. 128.

TYPE, *D. kirbyi* Kirby (S. Africa).

Range. Africa, India, China, Java.

Elongate, flattened above, with a rough dull surface above and beneath, and clothed in parts with coarse erect scale-like hairs. Head not very broad. Clypeus bidentate. Pronotum very uneven, with the base rounded, not margined. Scutellum distinct. Elytra flat, the striæ rather indistinct, the epipleuræ narrow, not covering the sides of the abdomen, which are flat and prominent (but concealed in *D. runicus* by the prominent lateral carinæ of the elytra). Elytra vertical behind, with a prominent horizontal fringe of scales or bristles. Pygidium rather long, very uneven. Middle coxæ very widely separated, rather more than half the length of the metasternum. Hind coxæ not contiguous. Abdomen rather large, very convex beneath. Legs rather long and slender; front tibia armed with four external teeth and serrate at the base; front tarsus short; middle and hind tibiæ long, dilating a little to the extremity, the tarsi long, with slender metatarsus. Antennæ 8-jointed. Labrum rounded at the front margin, with a strong median projection. Mandible with short hairy terminal part, the basal fringe composed of short hairs. Maxilla not long, with a large semicircular outer lobe, the palpus stout. Mentum transversely rectangular, bilobed, the 1st joint of the palpus small, the 2nd large and broadly oval, the 3rd extremely minute.

Lacordaire has incorrectly stated that *Drepanocerus* is without a scutellum.

Some species of this genus are amongst the strangest in appearance to be found in the Coprinæ, and the relatively great development of the horns in certain of the males is highly remarkable in such small insects. The relationship to *Oniticellus*, which is without horns in all its species, is, notwithstanding, exceedingly close, and it is difficult to find constant differential features except in the very uneven

surface and scaly clothing, which probably serve to retain a covering of excrementitious matter, perhaps for concealment. The two common Indian species, *D. setosus* and *D. sinicus*, are almost always found caked in this way. These two insects, in spite of the entirely different horns of the males, are extremely closely related, and the females are not easy to distinguish.

In some African forms a long horn occurs upon the head of the male in addition to a pair upon the thorax.

Key to the Species of Drepanocerus.

1 (6) Prosternum not elevated behind the front coxæ.	
2 (5) Terminal tooth of the front tibia directed forward ; pronotum not ridged at the base.	
3 (4) Front angles of the pronotum distinct ; head finely and not closely punctured ; ♂ with a single thoracic horn........	*setosus* Wied., p. 381.
4 (3) Front angles of the pronotum indistinct ; head coarsely and closely punctured ; ♂ with two thoracic horns	*sinicus* Har., p. 383.
5 (2) Terminal tooth of the front tibia lateral ; pronotum with six longitudinal ridges at the base........................	*runicus* Arrow, p. 384.
6 (1) Prosternum elevated behind the front coxæ, continuous with the metasternum	*exsul* Sharp, p. 385.

324. **Drepanocerus setosus.**

Copris setosa Wied.,* Zool. Mag. ii, 1, 1823, p. 19.
Ixodina setosa Motsch.,* Bull. Mosc. ii, 1863, p. 459.

Black, with the antennæ and tarsi reddish, and clothed with grey or dirty yellow scale-like setæ.

Elongate-oval and a little depressed. The *head* is rather narrow, unevenly and unequally punctured, with the sides nearly straight and parallel behind, the *clypeus* bidentate and deeply impressed between the teeth. The *pronotum* is very closely covered with large shallow pits. The sides are gently rounded in front, nearly straight behind, the front angles are blunt, the hind angles almost obsolete, and the base is obtusely angulate in the middle. The *elytra* are opaque, broadly but very shallowly striate, with a nearly straight setose ridge upon the anterior half of the 3rd interval, an entire bisinuate setose ridge upon the 5th interval, and one upon the 7th interrupted behind the shoulder. The *pygidium* is opaque and setose, hollowed at the base and apex, and bears a transverse elevation in the middle and a longitudinal carina upon the anterior half. The *metasternum* is densely and shallowly pitted, coarsely at the sides and more finely in the middle. The front tibia is broad and bears three short blunt lateral teeth and a sharper one upon the straight front margin.

♂. The pronotum has a small anterior lateral depression on each side and a large posterior depression. From the middle of the latter springs a slender dorsal horn, directed obliquely forward, its extremity a little bifurcate, but the tips scarcely diverging.

♀. The pronotum has a rather large median posterior depression, a smaller one in front of it, and an anterior lateral depression on each side.

Length, 4·5–5·5 mm. ; breadth, 2·5 mm.

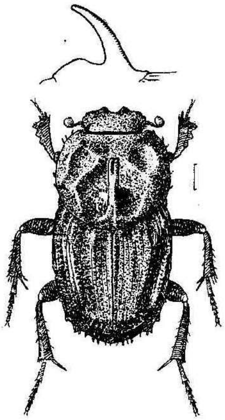

Fig. 53.—*Drepanocerus setosus*, ♂, and lateral view of thoracic process.

U. Prov. : New Forest, Dehra Dun (*S. Bahadur*, April) ; W. Almora, Kumaon (*H. G. Champion*, April, Oct.). C. Prov. : Amarkantak, 3200 ft., Jaithari Range, Umaria, Rewah State (*C. F. C. Beeson*, Nov.) ; Nagpur, 1000 ft. (*E. A. D'Abreu*). Madras : Nilambur (*C. F. C. Beeson*, Aug.). Ceylon : Kandy (*G. E. Bryant*, July) ; Kitulgalle, 1700 ft. (*G. Lewis*, Jan.) ; Bintenne (*G. M. Henry*, Oct.) ; Homagama, W. Prov. (*G. M. Henry*, Mar.) ; Rangala (*G. M. Henry*, April) ; Hakgala (*G. M. Henry*. Aug.).

Type in the Copenhagen Museum ; that of Motschulsky in the Leningrad Museum.

325. **Drepanocerus sinicus.**

Drepanocerus sinicus Har., Col. Hefte, iv, 1868, p. 104.
Drepanocerus setosus Boh., Eugen. Resa, 1850, p. 50.

Black, with the antennæ and tarsi reddish, and clothed with erect grey or yellowish scale-like setæ.

Elongate-oval and rather depressed. The *head* is densely sculptured and opaque, except upon the *clypeus*, which is rather strongly punctured and shining. The sides are nearly straight behind and a little divergent, and the clypeus is bidentate and deeply impressed between the teeth. The *pronotum* is very closely covered with large shallow pits. The sides are nearly straight in front, gently sinuate behind, the front

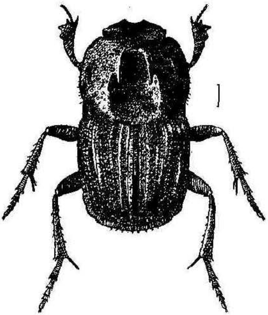

Fig. 54.—*Drepanocerus sinicus*, ♂.

angles extremely blunt, the hind angles almost obsolete, and the base obtusely angulate in the middle. The *elytra* are opaque, broadly but very shallowly striate, with a straight setose ridge upon the anterior half of the 3rd interval, an entire bisinuate ridge upon the 5th interval, and one upon the 7th interrupted behind the shoulder. The *pygidium* is opaque, hollowed at the base and apex, and has a narrow longitudinal carina in the middle of the basal half and a pair of rounded bosses at the base of the posterior half. The *metasternum* is densely and shallowly pitted, coarsely at the sides, and rather more finely in the middle. The front tibia is broad and bears three short blunt lateral teeth and a sharper one upon the straight front margin.

♂. The pronotum is deeply excavated along the middle for about a third of its width, and the lateral margins of the excavation are strongly raised anteriorly and produced into a pair of sharp parallel horns, which curve backward. The lateral part of the pronotum forms two slight longitudinal depressions, separated by a longitudinal ridge.

♀. The pronotum bears an anterior and a larger posterior median depression, as well as a lateral one on each side.

Length, 4·5–5·5 mm. ; breadth, 2·5 mm.

U. Prov. : Dhobi Ghat, Mussoorie (*M. Bose*, April) ; W. Almora, Kumaon (*H. G. Champion*, Aug.) ; Suswa R. (*C. F. C. Beeson*, Nov.). Burma : Asciuii Ghecu, Karen Hills, 3600–4500 ft. (*L. Fea*, April). S. China.

Type in the Stockholm Museum. The name *setosus* was changed by Harold, owing to its previous use by Wiedemann for the preceding species.

Found in cattle-dung.

326. **Drepanocerus runicus.**

Depranocerus runicus Arrow, Ann. Mag. Nat. Hist. (8) iv, 1909, p. 93.

Dull black, with the legs dark red and the antennæ yellow, the head, the outer margins of the prothorax, and the extremities of the elytra bearing short pale setæ.

Elongate-oval and depressed. The front tibia is armed with four teeth placed laterally. The *head* is finely and fairly closely punctured, with the *clypeus* bidentate and the vertex bearing three short longitudinal carinæ. The *pronotum* is rather coarsely and closely punctured, and deeply and widely excavated transversely just before the middle. Outside the excavation on each side there are two curved longitudinal carinæ, the outer one extending from the anterior margin to the lateral margin a little past the middle, and the inner one from a little behind the front margin to the hind margin. The transverse excavation is crossed on each side by a narrow longitudinal bridge, which divides into two longitudinal carinæ both in front and behind, the four posterior carinæ being equidistant. The *elytra* are widely but very shallowly striate, with large indistinct punctures in the striæ and very flat intervals. The outer margins are strongly carinate, and there is a very strong inner lateral carina parallel with the outer margin on each side. The *pygidium* is opaque and a little hollowed at the apex. The *metasternum* is strongly and densely punctured. The abdomen is very convex beneath, and the intersegmental sutures are partly effaced in the middle.

♂. The two innermost carinæ upon the anterior half of the pronotum are very strongly raised.

Length, 3·5–4 mm.; breadth, 1·5–2 mm.

BURMA: Asciuii Ghecu, Karen Hills, 4200–4500 ft. (*L. Fea*, April). TONKIN.

Type in the British Museum.

It is very probable that in the most highly developed males the thoracic carinæ are produced into pointed processes. The specimens in which these carinæ are not elevated are perhaps not females, but males of inferior development. The triple thoracic cavity which, although usually clogged with dirt, is continuous beneath the dorsal ridges, is a remarkable feature.

327. **Drepanocerus exsul.**

Oniticellus exsul Sharp, Col. Hefte, xiii, 1875, p. 53.

Brown, entirely covered above and beneath with a greyish earthy matter.

Elongate, subrectangular, very flat above, with rather long and slender legs. The *head* is flat, very broad in front

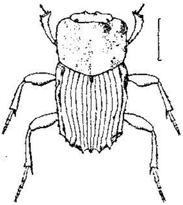

Fig. 55.—*Drepanocerus exsul.*

of the eyes, the *clypeus* with the sides straight and convergent and the front margin bidentate, the teeth feeble and not far apart. The *pronotum* has a slight broad elevation in front, and the sides are flat but with a transverse depression near the middle, the lateral margins converging towards the base, strongly rounded in front, nearly straight behind, and the base obtusely angular in the middle. The *scutellum* is long and narrow. The *elytra* are moderately finely striate, with rather inconspicuous punctures in the striæ, and the intervals are flat. The outer striæ and the sides of the elytra are sinuous, and the extremities are abruptly deflected and bear three

prominences on each in addition to the produced sutural intervals. These prominences bear stiff bristles. The *pygidium* has a tufted prominence on each side of the middle, and the base is a little hollowed on each side. The prothorax is deeply but narrowly hollowed beneath the front angles to receive the front femora. The *prosternum* is straight behind. The *metasternum* is very large and flat. The middle and hind tibiæ are slender and bear only minute bristles at their outer edges.

♂. The front tibia is strongly curved at its inner edge, its apical edge is very broad and its outer edge armed with three very blunt and feeble teeth.

♀. Unknown.

Length, 8 mm.; breadth, 4 mm.

ASSAM: Patkai Hills (*W. Doherty*). SIAM (*Mouhot*).

Type in M. Oberthür's collection.

This will be easily recognized by its earthy covering and the curiously flat upper surface. It has the elongate shape of *Oniticellus*. In the recent catalogue of MM. Gillet and Boucomont it is called *Cyptochirus exsul*, and *Drepanochirus* is treated as a synonym of *Cyptochirus*. The latter name, however, is uncharacterized, and therefore invalid. *Drepanochirus* (Péringuey), formed for the African species *ambiguus* Kirby, is stated by its author to differ from *Drepanocerus* by the presence of a scutellum and the invisibility of its eyes above. These differences have no existence, and if the genus is retained certain species of *Drepanocerus* will have to be referred to it. Another generic name would then be needed for the present insect. As I have seen only a single specimen, I consider it premature at present to separate it.

Genus ONITIS.

Onitis Fab., Ent. Syst., Suppl. 1798, p. 2; Lacord., Gen. Col. iii, 1856, p. 103; Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 49.

TYPE, *Scarabæus inuus* F. (*O. sphinx* F.), W. Africa.

Range. Europe, Africa, Asia.

Usually rather oblong in shape, with the legs stout and not long (except the front legs of the male), the front tarsi wanting. Front tibia armed with four external teeth; middle and hind tibiæ strongly dilated at the extremity; middle and hind tarsi with progressively diminishing joints, the basal joint more than twice as long as the 2nd. Head not very broad, the ocular lobes united by a carinate suture with the clypeus, of which the margin is rounded or a little excised in the middle. Pronotum without process or excavation, the base a little prominent in the middle, usually without complete margin, but with a pit or impression on each side near the middle.

Scutellum visible but minute. Elytra with simple narrow epipleuræ, the delimiting carina very strongly marked and rather straight. Front coxæ very prominent; middle coxæ long, parallel, and far apart. Abdomen completely covered, with a continuous carina around the sides and pygidium. Antennæ 9-jointed, all the joints except the basal one very short, the club compact, its first joint cup-shaped, smooth and chitinous, enclosing the succeeding joint, which, with the last, is spongy in texture. Mandible oval, with long terminal fringe. Membranous lobe of the maxilla broad, the palpus not very long. Labium and labial palpi clothed with very long bristles, the palpi flat, the basal joint not much dilated, the 2nd long, the 3rd minute.

♂. The front legs are more or less elongate, the tibia generally slender and strongly curved towards the end, without an articulated terminal spur, but with the tip produced into a finger-like process, the external teeth feebler than those of the female, and sometimes with one or more teeth on the lower face. The front, middle, and hind femora, or some of them, may be toothed at the edge, or the hind trochanters spinose, and the middle tibia may have an angular projection at the inner edge a little beyond the base.

♀. The head sometimes bears a frontal tubercle or short horn, absent or feebler in the male. The front tibia is always broad, with strong teeth, and provided with an articulated terminal spur.

The genus *Onitis* is easily recognized by its various peculiar features, the most important of which are the absence of front tarsi, combined with short, dilating, posterior tibiæ, the basal impressions of the pronotum, visible scutellum, and strong single lateral carina to the elytra. A very remarkable phenomenon is the greater development in the females of some of the species than in the males of the head armature, especially striking in two African species, *O. tridens* and *O. castelnaui*. The male usually exhibits curious modifications of the legs.

The habits of the rather numerous species will probably be found to be similar to those of the species of *Copris*. J. H. Fabre, in a short note in 'Souvenirs Entomologiques' (series iv, p. 83), expressed the opinion that a European species, *O. belial*, nearly related to some of the Indian forms, stores for its young a mass of food packed into a sausage-shaped excavation, in the manner of *Geotrupes*. Dr. Chobaut (Bull. Soc. Ent. France, 1922, p. 264) has declared this to be incorrect, and records the discovery of a female in a spacious chamber at the bottom of a shaft 16 in. deep, with a mass of material apparently ready for conversion into "pears," in the manner of *Copris*.

Key to the Species of Onitis.

1	(18)	Pygidium smooth, entirely without hair.	
2	(7)	Clypeo-frontal carina simple and entire.	
3	(4)	Clypeus without a carina	*siva*, Gill., p. 388.
4	(3)	Clypeus with a carina.	
5	(6)	Black ; pronotum very lightly punctured	*lama* Lansb., p. 389.
6	(5)	Metallic ; pronotum strongly punctured........................	*humerosus* Pall., p. 390.
7	(2)	Clypeo-frontal carina interrupted or with a tubercle in the middle.	
8	(11)	Narrow ; pronotum very feebly punctured.	
9	(10)	Metasternum transversely excavated in the middle..................	*excavatus*, sp. n., p. 391.
10	(9)	Metasternum not transversely excavated in the middle	*falcatus* Wulf., p. 392.
11	(8)	Broader ; pronotum well punctured.	
12	(15)	Metasternum longitudinally grooved in front.	
13	(14)	Pronotum without a smooth median line ; ♂, front femur not toothed ..	*philemon* F., p. 393.
14	(13)	Pronotum with smooth median line ; ♂, front femur toothed	*singhalensis* Lansb., [p. 394.
15	(12)	Metasternum flat, not grooved.	
16	(17)	Clypeo-frontal carina broadly interrupted ; ♂, terminal external tooth of the front tibia projecting in front.	*subopacus*, n. n., p. 395.
17	(16)	Clypeo-frontal carina narrowly interrupted ; ♂, terminal external tooth of the front tibia tapering in front..	*virens* Lansb., p. 396.
18	(1)	Pygidium more or less hairy.	
19	(20)	Clypeus pointed ; head not tuberculate.	*feæ* Felsche, p. 397.
20	(19)	Clypeus truncate or excised ; head tuberculate.	
21	(22)	Tubercle placed on the clypeo-frontal carina	*castaneus* Redt., p. 398.
22	(21)	Tubercle placed behind the clypeo-frontal carina.	
23	(24)	Large ; elytra rather smooth	*brahma* Lansb., p. 399.
24	(23)	Smaller ; elytra rough and opaque ..	*crassus* Shp., p. 400.

328. **Onitis siva.** (Plate XI, figs. 13, 14.)

Onitis siva Gillet, Ann. Soc. Ent. Belg. lv, 1911, p. 313.

Black or very deep reddish-black. Elongate-oval, moderately convex, not very shining. The *clypeus* is finely and densely transversely rugose and the forehead rugosely tuberculate, the two areas divided by a strongly elevated and curved carina, continued backwards along the inner margin of each eye to meet the posterior marginal carina, which is more strongly elevated in the middle. The clypeal margin is strongly rounded and entire. The *pronotum* is strongly

and unevenly punctured, the punctures becoming confluent in front and giving place to minute granules near the lateral margins. There is a trace of a longitudinal median groove posteriorly, uniting with the close and narrow basal foveæ. The sides are straight in front and bisinuate behind, the front angles acutely rectangular and the hind angles obsolete. There is a fine entire basal margin, and the base is prominent but scarcely lobed in the middle. The *elytra* are finely striate, the striæ are very minutely punctured, the intervals flat, opaque, and minutely and sparingly punctured, but the sutural and lateral margins and the shoulders are shining and more distinctly punctured. The *pygidium* is flat and not distinctly punctured. The *metasternum* is densely hairy at the sides and less densely in the middle, with a small smooth but moderately punctured area at the base.

♂. The front legs are elongate, the femur armed with a very strong spine at the middle of the anterior edge, the tibia slender, strongly curved anteriorly, armed with four sharp outer teeth, the two terminal ones close together, an irregular row of about five sharp teeth beneath, and a long incurved terminal process. The middle femur bears a sharp tooth just beyond the middle of its lower edge, and the tibia is slender at the base and rather abruptly dilated a little beyond it. The hind femur is a little hollowed on its lower face and has a hooked tooth just beyond the middle of its anterior edge.

♀. The median elevation of the posterior marginal carina of the head is broader and stronger than in the male, the prothorax is rather shorter, the front tibia nearly straight, with an articulated terminal spur, the femora without teeth and all convex beneath.

Length, 30 mm. ; breadth, 16 mm.

S. INDIA : Nilgiri Hills (*H. L. Andrewes*).

Type in Dr. Gillet's collection.

329. Onitis lama. (Plate XI, figs. 11, 12.)

Onitis lama Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 123.

Black and shining, with the legs and lower surface clothed with reddish hair.

Rather narrowly oval and very convex. The *head* bears an entire, strongly elevated, and slightly arcuate frontal carina, a short straight transverse carina upon the *clypeus*, and a trisinuate carina upon the vertex, extending from eye to eye. The *pronotum* is distinctly and moderately closely punctured in front and extremely minutely behind. The front angles are rather blunt, the sides strongly rounded, and the base almost completely margined and rather strongly

lobed between the deep basal foveæ. The *elytra* are very smooth, with fine striæ, the sutural interval bearing a few punctures and the posterior edge bearing a short fringe of erect yellow hairs. The *pygidium* is opaque and smooth, with very minute scanty punctures. The metasternal shield is smooth in the middle and behind, fairly strongly punctured in front and at the sides, and the sides of the *metasternum* are densely punctured and hairy.

♂. The clypeus is deeply excised in the middle of the front margin and not very closely rugulose, and the posterior part of the head is very finely and sparsely punctured. The front femur has a very sharp oblique tooth beyond the middle of its lower edge, and the front tibia is elongate, armed with four short external teeth, a strong sharp tooth on the lower face before the middle and three or four minute tubercles, and an incurved apical process. The hind femur is rather long and straight, with a tooth near the end of the lower edge, the trochanter is a little produced at the tip, and the hind tibia is finely serrate along its inner edge.

♀. The clypeus is closely rugulose, with its front margin entire and slightly truncate. The pronotum is rather more strongly punctured anteriorly than that of the male. The front tibia is broad, armed with four blunt external teeth and a small articulated terminal spur.

Length, 19–24 mm.; breadth, 11–13 mm.

PUNJAB. U. PROV.: W. Almora (*H. G. Champion*, July); Sitapur (*H. G. Champion*).

Type in M. René Oberthür's collection.

330. **Onitis humerosus.** (Plate I, fig. 1.)

Scarabæus humerosus Pallas, Reise Russ. Reich. i, 1771, p. 462; Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 116.

Bright metallic green, coppery, indigo-blue or violet, with the elytra bright yellow and each decorated with four narrow, longitudinal, green or blue lines upon the elevated costæ, the pale intervals sometimes having a light metallic green lustre, sometimes partly or entirely suffused with green or blue.

Oval, convex, not very shining. The *head* is closely covered with fine tubercles, with the clypeus parabolic in shape and separated from the forehead by an entire slightly curved carina. The *clypeus* bears a transverse carina not reaching the sides, and the vertex bears a well marked median tubercle. The *pronotum* is strongly and densely rugose upon its anterior half, more unevenly sculptured upon the posterior half, which has a more or less triangular median depression containing the closely approximate deep basal foveæ. On each side of the median depression the pronotum is strongly punctured,

near the hind angles it is finely and sparingly punctured, and near the front angles and the basal foveæ it is finely granular. The sides are straight in front, very strongly bisinuate behind, the front angles are rather sharply rectangular, the hind angles are distinct but very blunt, and the base is feebly lobed in the middle. The *elytra* are finely striate, with the 1st, 3rd, and 5th intervals elevated and narrower than the 2nd and 4th. These elevated intervals, as well as the shoulder-prominence and the sublateral carina, are shining and finely punctured, and the intervening surface is opaque and scarcely distinctly punctured. The *pygidium* is shining and finely and sparsely granular. The metasternal shield is broad, granular in front, sparingly punctured behind, and rather thinly clothed with hair. The sides of the *metasternum* are closely granular and hairy.

♂. The clypeal carina is short and nearly straight. The front femur and tibia are very elongate, the tibia slender, strongly curved in its outer half, and armed with four short external teeth, a strong tooth at the middle of the lower surface, and a strong incurved terminal process. The lower edges of the middle and hind femora and the inner edge of the middle tibia are serrate, and the hind femur bears a very strong hooked tooth near the middle of its upper edge.

♀. The clypeal carina is long and curved, and the space between it and the front margin is covered with yellow, close-lying, scale-like hairs. The legs are short and stout, the front tibia broad and armed with four strong external teeth and an articulated terminal spur.

Length, 12·5–18·5 mm.; breadth, 7–10 mm.

PUNJAB: Burhan (*T. H. L. Grosvenor*, March). PERSIA. TURKESTAN. SYRIA. ASIA MINOR. S. RUSSIA.

Type ? in the Berlin Zoological Museum.

331. **Onitis excavatus**, sp. n. (Plate XII, fig. 19.)

Black and shining, with the elytra and pygidium subopaque, the antennæ, mouth-organs and hairy clothing of the legs and lower surface reddish.

Rather narrowly oval, moderately convex. The *clypeus* is shortly elliptical, moderately closely and finely rugulose, with the front margin entire. The clypeo-frontal carina is widely interrupted in the middle, and there is a short transverse clypeal carina in front of it and a small frontal tubercle behind it. The posterior part of the head is irregularly granular. The *pronotum* is very smooth, with irregular minute punctures in front and without a longitudinal groove, the base very obtusely angular and not margined. The *elytra* are very finely striate, with the 1st, 3rd, and 5th

intervals a little raised and narrower than those between them, which are flat. The *pygidium* is smooth and unpunctured. The metasternal shield is thickly hairy in front, smooth and shining behind, and has a very deep transverse excavation in the middle. The sides of the *metasternum* are very closely hairy.

♂. The front tibia is elongate, with a serrate carina upon its anterior half beneath, four short external teeth, the terminal one very broad and blunt, and a sharp incurved terminal process. The middle femur has a rounded lobe in the middle of the hinder edge, two sharp teeth near the extremity above and one beneath. The trochanters of the hind legs are acutely produced.

♀. Unknown.

Length, 25 mm.; breadth, 13 mm.

TENASSERIM (*E. T. Atkinson*).

Type in the British Museum.

O. excavatus closely resembles *O. falcatus*, but is larger and rather less narrow in shape. It is very easily recognized by the deep transverse excavation behind the middle of the metasternum. The middle femur of the male has a sharp angular notch at its extremity, forming a strong sharp tooth at the hind margin.

332. **Onitis falcatus.** (Plate XI, figs. 9, 10.)

Scarabæus falcatus Wulf., Descr. Cap. Ins. 1786, p. 14, pl. 2, fig. 17.
Onitis falcatus Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 126.
Onitis himaleyicus Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 518.

Black or nearly black, with a clothing of reddish-yellow hair upon the legs and lower surface, smooth and shining, with the elytra and pygidium subopaque.

Rather narrowly oval, convex. The *clypeus* is elliptical, moderately closely and finely rugulose, and scarcely perceptibly excised in the middle. The clypeo-frontal carina is widely interrupted in the middle and there is a short transverse clypeal carina in front of it and a short frontal tubercle behind it. The posterior part of the head is irregularly granular. The *pronotum* is finely and rather sparingly punctured, without a well-marked median groove or line, the base strongly rounded but not distinctly lobed, and only margined between the basal foveæ, which are deep. The *elytra* are very finely striate, with the 1st, 3rd, and 5th intervals a little raised and distinctly narrower than the 2nd and 4th. There are a few fine irregular punctures upon the 1st (sutural) interval. The *pygidium* is opaque, smooth, and unpunctured. The metasternal shield is very smooth and feebly punctured, except in front, where it is roughly punctured and hairy. The sides of the *metasternum* are finely and densely punctured and closely hairy.

♂. The front tibia is elongate, armed with four short external teeth, two or three minute teeth before the middle of the lower surface, and a sharp incurved terminal process. There is a minute tooth near the end of the lower edge of the middle femur.

♀. The front tibia is rather uniformly curved and armed at the tip with an articulated spur.

Length, 16–23 mm. ; breadth, 8–12 mm.

U. PROV. : W. Almora (*H. G. Champion*, Aug.). BOMBAY : Belgaum (*H. E. Andrewes*). MADRAS : Shevaroy Hills ; Mahé, Malabar. BIHAR : Pusa (*D. Nowrojee*, April). BENGAL : Singla, 1500 ft., Darjeeling Dist. (June) ; Palamon (Sept.) ; Sitapahar R., Chittagong Hill Tracts (*C. F. C. Beeson*, May). BURMA : Rangoon (*L. Fea*, May) ; Bhamo (*L. Fea*, July) ; Teinzo (*L. Fea*, May) ; Mimbu (*T. Bainbrigge Fletcher*, Aug.) ; Kalaw, 4500 ft. (*Y. R. Rao*, May) ; Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.), Ghecu, 3900–4200 ft. (*L. Fea*, Feb., Mar.). MALAY PENINSULA. PHILIPPINE IS. S. CHINA.

Type unknown ; that of *himaleyicus* in the Vienna Museum.

333. **Onitis philemon.** (Plate XI, figs. 3, 4.)

Onitis philemon F.,* Syst. Eleut. i, 1801, p. 30.
Onitis distinctus Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 138 (new syn.).

Green, coppery or bronzy-black, moderately shining.

Oval, not very elongate nor very convex. The *head* is rugulose, with the ocular lobes rather smooth, the *clypeus* parabolic, with an extremely feeble emargination of the front edge in the middle, and separated from the forehead by an interrupted curved carina, with a short transverse carina just before it and a conical tubercle just behind it. The *pronotum* is fairly strongly and closely but unevenly punctured, without well-marked median line. The lateral margin is straight in front, strongly rounded in the middle, and gently bisinuate behind, with the front angles rectangular and the hind angles obsolete. The base is obtusely angulate in the middle. The *elytra* are moderately strongly striate and the intervals very finely and sparsely punctured. The 1st, 3rd, and 5th intervals are a little narrower and usually a little more elevated than the 2nd and 4th. The *pygidium* is very feebly and sparsely punctured. The metasternal shield is smooth and feebly punctured, except near the anterior angles, where it is thinly hairy, and the sides of the *metasternum* are densely granulate and hairy.

♂. The clypeus is granulate. The front legs are elongate, the tibia slender, strongly curved in front, armed with four feeble teeth externally, finely serrate internally in the basal

half and strongly produced at the apex. The middle femur has a sharp tooth near the end of the lower edge, and sometimes a rounded lobe in the middle, and the middle tibia is slender at the base and abruptly dilated near the middle. The hind trochanter is a little toothed beneath.

♀. The clypeus is closely transversely rugose. The front tibia is broad and armed with four strong teeth and an articulated terminal spur.

Length, 14–19 mm. ; breadth, 7·5–10·5 mm.

BENGAL : Sarda (*F. W. Champion*). BIHAR : Pusa (*D. Nowrojee*, April, June, July) ; Chapra (*Mackenzie*). U. PROV. : W. Almora (*H. G. Champion*) ; Dehra Dun (*M. Bose*, Sept.). PUNJAB : Burhan (*T. H. L. Grosvenor*, Mar.). BOMBAY : Baroda (*Vinciguerra*, Nov.) ; Belgaum (*H. E. Andrewes*). C. PROV. : Nagpur (*E. A. D'Abreu*, July, Aug.) ; Hoshangabad (*H. M. Lefroy*, July). C. INDIA : Mhow (*E. Selous*). MYSORE : Bangalore (*B. M. Bhatia*, Aug.). S. INDIA : Coimbatore (June) ; Nilambur (*S. K. Pillai*, July). CEYLON : Galle (*d'Albertis*, Dec.) ; Medumahanuwara (*G. M. Henry*, April).

Type in the Copenhagen Museum ; that of *distinctus* Lansb. in the Brussels Museum.

Lansberge wrongly determined *O. philemon*, of whieh he erroneously states the type to be in the Banks collection in the British Museum.

334. **Onitis singhalensis.** (Plate XI, figs. 5, 6.)

Onitis singhalensis Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 140.

Coppery or greenish-coppery, not very shining. Elongate-oval, not very narrow nor very convex. The *head* is rather closely granular, the ocular lobes a little more sparingly. The *clypeus* is slightly bidentate in the middle of the front margin and separated from the forehead by a straight carina interrupted in the middle, with a short transverse carina just before it and a conical tubercle immediately behind. The *pronotum* is fairly strongly but unevenly punctured, with a well-marked smooth median line. The lateral margin is feebly curved in front and gently bisinuate behind, with the front angle very blunt and the hind angle obsolete. The base is strongly rounded. The *elytra* are moderately strongly striate and the intervals very minutely punctured. The 1st, 3rd, and 5th intervals are a little narrower and more elevated than the 2nd and 4th. The *pygidium* is scarcely perceptibly punctured. The metasternal shield is strongly channelled along the middle, with the sides punctured and clothed with long hair, rather closely in front. The sides of the *metasternum* are closely granular and hairy and the middle is very smooth and shining.

♂. The front legs are elongate, the tibia slender, very strongly bent in front, strongly produced at the apex, armed externally with four short teeth, and finely serrate basally beneath. The front femur has a strong but not sharp tooth towards the end of its anterior edge. The middle femur has a sharp tooth near the middle of its posterior edge and another at the extremity, and the middle tibia is slender at the base and abruptly and angularly dilated before the middle. The hind trochanter bears a sharp tooth.

♀. The clypeus is a little longer and more rugulose. The front tibia is broad and armed with four strong external teeth and an articulated terminal spur.

Length, 19–22 mm.; breadth, 10–12 mm.

S. India: Nilgiri Hills (*H. E. Andrewes*); Santicoppa, N. Coorg (*T. Bainbrigge Fletcher*, May): Yercaud, Salem Dist. (*P. V. Isaac*, May).

Type in M. René Oberthür's collection.

The unique type was believed to have come from Ceylon, but no precise locality was recorded, and, as all other known examples are from Southern India, it seems probable that a mistake was made, and the species does not really occur in Ceylon.

335. **Onitis subopacus**, *nom. nov.*

Onitis philemon Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 133.

Black or pitchy-black, with a slight metallic lustre, the head and prothorax moderately shining and the elytra rather dull.

Oval, rather narrow, smooth, and moderately convex. The *clypeus* is elliptical, with its margin entire and closely and finely transversely rugulose, separated from the vertex, which is granulate and more shining, by a broadly interrupted carina. There is a short transverse clypeal carina in front of the interrupted carina, and a conical tubercle behind it. The *pronotum* is rather closely but not very strongly punctured, usually with an incomplete smooth median longitudinal line, the basal margin with a deep pit on each side of the middle. The *elytra* are finely striate, and the 1st, 3rd, and 5th intervals are usually slightly convex. The *pygidium* is opaque and scarcely or not at all punctured. The metasternal shield is smooth and shining behind, and its front angles, as well as the sides of the *metasternum*, are closely clothed with reddish hair.

♂. The front tibia is elongate, slender, and strongly curved, with a single or double tooth near the base beneath. It is prolonged into a long blunt spine at the extremity, and armed externally with three short teeth and a blunt terminal process,

prominent (not tapering) in front. The middle femur bears a rounded lobe near the middle of the posterior edge and a sharp tooth towards the end. The middle tibia is slender at the base and strongly and abruptly dilated. The trochanter of the hind leg is sharply toothed.

♀. The front tibia is short, with four stout external teeth, and the middle and hind legs are not toothed.

Length, 16–21 mm.; breadth, 9–12 mm.

KASHMIR: Haran, Sind Valley, 5500 ft. (*C. F. C. Beeson*, June); Harwan, Pohru Valley, 6000 ft. (*C. F. C. Beeson*, May). NEPAL: (*Maj.-Gen. Hardwicke*). ASSAM: Sylhet. BENGAL: Calcutta (*MacClelland*); Singla, Darjeeling Dist., 1500 ft. (June). BIHAR: Pusa (*T. Bainbrigge Fletcher*, April). U. PROV.: Jhajra, Dehra Dun (*Sher Bahadur*, Feb.). C. PROV.: Baihar, Balaghat (June); Supkhar, 2629 ft., Balaghat (*E. A. D'Abreu*, Jan.). C. INDIA: Harai, 2700 ft., Pharisamer Hills, Rewah State (*H. S. Pruthi*, Feb.). S. INDIA: Anaimalai Hills. CEYLON: Kalupahani, Haldummulle. BURMA. TENASSERIM: Tavoy (*W. Doherty*). SIAM. MALAY PENINSULA.

It is necessary to rename this species, which was incorrectly called *O. philemon* by Lansberge. It has a very close resemblance to *O. virens* Lansb., but the pronotum is rather less strongly punctured and without the fine impressed median line generally present in that species, and the elytra are in general more opaque. The frontal carina of the head is more widely interrupted, and in consequence the frontal tubercle is more isolated. The males can be easily distinguished by the different form of the front tibia, which has beneath a sharp tooth, sometimes double, instead of a serrate ridge, and its last external tooth is very blunt and directed forward, with a rounded lobe between it and the preceding tooth.

336. **Onitis virens.** (Plate XII, figs. 20, 21.)

Onitis virens Lansb.,* Ann. Soc. Ent. Belg. xviii, 1875, p. 135.
Onitis amplectens id.,* l. c. p. 136 (new syn.).

Black, with a very feeble metallic lustre, and moderately shining.

Oval, moderately convex and smooth. The *clypeus* is elliptical, with its margin entire, and closely and finely transversely rugulose, separated from the vertex, which is less rugulose and more shining, by a carina interrupted in the middle. There is a short transverse clypeal carina just before the interrupted carina and a conical tubercle just behind it. The *pronotum* is fairly closely and strongly punctured, usually with an incomplete, narrow, smooth median line in front and a slight narrow groove behind, the basal margin with a deep longitudinal pit on each side of the middle.

The *elytra* are finely striate, the dorsal striæ rather feeble, the external ones a little stronger, the intervals flat and not distinctly punctured, except the sutural ones, which are a little elevated and shining. The *pygidium* is flat, smooth, and feebly punctured. The metasternal shield is smooth and shining behind and the front angles, as well as the sides of the *metasternum*, are rather closely clothed with red hair.

♂. The front tibia is elongate, slender, and strongly curved towards the end, prolonged into a long blunt spine at the extremity, bears a finely serrate carina beneath, and is armed externally with four short teeth, of which the last closely adjoins the preceding one and has a continuation which is not prominent, as in *O. subopacus*, but slopes gradually to the end. The middle femur bears a strong rounded lobe at the middle of the posterior edge and a tooth a little before the extremity. The middle tibia is slender at the base and strongly and abruptly dilated. The trochanter of the hind leg is sharply toothed.

♀. The front tibia is short and broad, with four stout teeth, and the middle and hind legs are without teeth.

Length, 18–23 mm.; breadth, 10–13 mm.

BOMBAY: Belgaum (*H. E. Andrewes*). C. PROV.: Supkhar, 2629 ft., Balaghat Dist. (*E. A. D'Abreu*, Jan.); Chikalda, Berar, 3664 ft. (*N. B. Kinnear*, Nov.); Nawegaon, Bhandara Dist. (*E. A. D'Abreu*, Nov.); Karli, Bastar State (*E. A. D'Abreu*, Feb.). U. PROV.: Dehra Dun (June). S. INDIA: Sonawarpet, N. Coorg (*L. Newcome*, July); Nilgiri Hills (*H. L. Andrewes*); Anaimalai Hills; Peermade, Travancore (*P. V. Isaac*, April). BIHAR: Pusa (*D. Nowrojee*, Feb.–Aug., Nov.). BENGAL: Calcutta (*Ribbe*); Maini Mukh, Chittagong Hill Tracts (*R. P. Mullins*). ASSAM: Sylhet. BURMA: Rangoon (*L. Fea*, May); Teinzo (*L. Fea*, May); Bhamo (*L. Fea*, April); Mandalay (*L. Fea*, May); Cheba, Karen Hills, 2700–3300 ft. (*L. Fea*, Dec.); Asciuii Cheba, 3600–3900 ft. (*L. Fea*, Jan.); N. Tawngpeng, 4660 ft., N. Shan States (*J. Coggin Brown*, Feb.); Kawkareik (*L. Fea*, Jan., Feb.). TONKIN. S. CHINA.

Types of *virens* and *amplectens* Lansb. in the Brussels Museum.

337. **Onitis feæ.**

Onitis feæ Felsche,* Deutsche Ent. Zeits. 1907, p. 293.

Black and subopaque, with the head, lower surface, and legs very dark red, the pygidium and lower surface clothed with reddish hair, and the elytra bearing a fringe of similar hairs at the hind margin.

Broadly oval, compact and convex. The *clypeus* is elliptical,

with the front margin almost imperceptibly notched in the middle, finely and closely rugulose, and separated from the forehead, which is lightly rugosely punctured but not shining, by a straight, sharply elevated carina. The clypeus bears a fairly short, transverse, slightly curved or angular carina a little behind the middle, and the vertex bears a shorter transverse curved carina immediately before the carinate posterior margin of the head. The *pronotum* is strongly and closely punctured, without a smooth median line, but with a feebly indicated median groove, the base almost completely margined, distinctly lobed in the middle, with the basal foveæ very deep and the intervening space finely rugose and opaque. The *elytra* are very convex and entirely opaque except at the shoulders. The striæ are rather faint, the intervals slightly carinate along the middle, and the outer ones lightly and unevenly punctured. The *pygidium* is very feebly rugulose and rather thinly clothed with erect, fairly long, reddish hairs. The *metasternum* bears conspicuous granules, closer and finer at the front and sides, and rather long erect hairs, and is rather broadly grooved along the middle. The abdomen is hairy at the sides and smooth in the middle.

♂. The front femur has a sharp tooth near the middle of its front edge and the front tibia is elongate, with its tip strongly curved and produced, and there is a finely serrate carina beneath, with a slightly stronger tooth near the base. The middle coxa is toothed at its posterior end and the middle tibia is not excised at the base.

Length, 19 mm.; breadth, 11 mm.

BURMA: Asciuii Cheba, Karen Hills, 3600–3900 ft. (*L. Fea*, Jan.); Pangsari, N. Tawngpeng, N. Shan States, 4660 ft. (*J. Coggin Brown*, Feb.). INDO-CHINA.

Type in the Dresden Museum; co-type in the British Museum.

338. **Onitis castaneus.** (Plate XI, figs. 7, 8.)

Onitis castaneus Redt.,* Hügel's Kaschmir, iv, 2, 1848, p. 517; Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 144.

Deep chestnut-red, with the lower surface, pygidium, and legs clothed with erect yellow hair.

Short, compact and convex, moderately shining, with the elytra subopaque. The *head* bears an entire, strongly elevated frontal carina, acuminate in the middle. The *clypeus* has its outer margin strongly reflexed and straight in the middle, and bears a long transverse arcuate carina; it is very finely and closely transversely rugulose in front of this carina, and less finely and closely behind it. The vertex is strongly excavated, almost smooth in the middle and tuberculate at the sides. The *pronotum* is very unevenly punctured,

its anterior part strongly rugulose, and the area between the two basal impressions finely tuberculate. The front angles are rather blunt, the sides are bisinuate, and the base is distinctly lobed in the middle, where it bears two deep impressions rather close together. The *elytra* are finely striate, with the intervals flat and feebly punctured, the posterior margin bearing a fringe of outstanding yellow hairs. The *pygidium* is sparsely tuberculate and hairy. The *metasternum* is closely tuberculate and hairy, but with a smooth longitudinal median groove.

♂. The front femur bears a strong oblique spine near the middle of its anterior edge, and the front tibia is long, slender, and *strongly curved, prolonged into a long process at the* extremity, armed with four short teeth externally, and bearing a strong sharp tooth before the middle beneath, preceded by two or three smaller ones and succeeded by one small one near the middle. The middle coxa is produced into a point behind, and the middle tibia bears two strong processes at its outer edge, the first sharp and the second blunt.

♀. The front tibia is short and broad and bears four strong external teeth.

Length, 16–19 mm. ; breadth, 9·5–12 mm.

SIND : Karachi (*T. R. Bell*). PUNJAB : Ghazi Ghat, Multan Div. (*C. F. C. Beeson*, Feb.) ; Pirawala, Multan Dist. (*C. F. C. Beeson*, Feb.). U. PROV. : Kheri Forest (*H. G. Champion*, Jan.) ; W. Almora ; Jhajra, Dehra Dun (*Sher Bahadur*, Feb.). BIHAR : Pusa (*G. P. Pillai*, July). BENGAL : Sarda (*F. W. Champion*). ASSAM : Baroma (*Patel*, Feb.).

Type in the Vienna Museum.

339. **Onitis brahma.** (Plate XI, figs. 15, 16.)

Onitis brahma Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 142.

Black or dark chestnut-brown, with the antennæ, mouth-organs and the long hairy clothing of the lower surface and legs red.

Rather elongate, parallel-sided. The *head* is finely granulate, the granules rather close upon the clypeus and rather less close behind. The clypeal margin is strongly reflexed and a little excised in the middle, forming two obtuse angles. The *clypeus* is separated from the forehead by an interrupted carina, with a sharply elevated transverse carina a little in front of it, and a truncate tubercle a little behind. The *pronotum* is rugose in front and punctured behind, with a posterior median groove uniting behind with the basal foveæ. The sides are nearly straight in front and behind, strongly rounded in the middle, the front angles are right angles, and the hind angles almost obsolete. The base is very

finely margined and distinctly lobed in the middle. The *elytra* are rather deeply striate and the intervals slightly convex, almost unpunctured, but not very shining. The *pygidium* is sparingly punctured and bears a fairly long but scanty clothing of hairs. The *metasternum* is rather closely clothed with reddish hair and has a slightly raised longitudinal ridge in the middle.

♂. The clypeus is granulate, but not very closely, and shining. The pronotum is rather shining, its anterior half granulate or rugose and its posterior half punctured. All the trochanters, but especially those of the front legs, are a little produced at the tip. The front legs are elongate, the femur bearing a blunt anterior process a little before the extremity, the tibia slender, strongly curved in its anterior half, armed with four external teeth, a very sharp one before the middle beneath, and a long incurved terminal process. The middle femur bears a sharp tooth near the middle of its lower edge. The hind femur bears a sharp, outwardly directed tooth at its upper edge near the base and a blunt lobe before the middle of its lower edge.

♀. Generally rather more reddish in colour, especially upon the posterior and lateral parts of the elytra. The clypeus is more densely granular and not shining. The pronotum is closely rugose upon the larger part of its surface. The front tibia is armed with four strong external teeth and an articulated terminal spur.

Length, 21–26 mm.; breadth, 11–13·5 mm.

BOMBAY: Dharwar (*H. Swale*, Nov.). C. PROV.: Shahpur, Betul Dist., 2000 ft. (*E. A. D'Abreu*, Mar.); Supkhar, 2629 ft., Balaghat Dist. (*E. A. D'Abreu*, Jan.). C. INDIA: Amarkantak, Rewah State, 3300 ft. (*H. S. Pruthi*, Jan.); Harra, Rewah State, 2625 ft. (*H. S. Pruthi*, Jan., Mar.). MYSORE: Bangalore (*T. H. L. Grosvenor*).

Type in the Brussels Museum.

340. **Onitis crassus.** (Plate XI, figs. 1, 2.)

Onitis crassus Sharp,* Col. Hefte, xiv, 1875, p. 48.
Onitis vischnu de Borre,* C. R. Soc. Ent. Belg. xxv, 1881, p. 39 (new syn.).

Black, not very shining, with the antennæ, organs of the mouth, and the hairy clothing of the legs and the sides of the body beneath reddish-yellow.

Oval, moderately compact, convex. The *head* is finely and fairly closely tuberculate, with the front of the clypeus transversely rugulose and its anterior margin strongly elevated. The *clypeus* is separated from the forehead by an entire slightly curved carina, there is a shorter curved transverse

carina upon the clypeus, and a small median tubercle upon the forehead. The *pronotum* is strongly and rather closely punctured, becoming rugose in front. The sides are straight in front, bisinuate behind, with the front angles sharply rectangular, the hind angles very obtuse, and the base bluntly lobed in the middle. The *elytra* are finely striate, the dorsal intervals are rather angularly elevated along the middle and finely and fairly closely punctured. The intervals nearest the suture are partly shining, the rest entirely opaque. The *pygidium* is opaque and lightly and irregularly rugulose, with scanty short setæ. The metasternal shield is smooth, shining, and feebly and sparsely punctured, and the sides of the *metasternum* are rugosely punctured and clothed with long hairs.

♂. The front margin of the clypeus is gently excised in the middle, the front legs are elongate, the front trochanter has a blunt process extending a little backward, the tibia is slender and strongly curved, armed with four sharp external teeth, a serrate carina beneath, and a long incurved terminal process, with a brush of long golden hairs. The hind femur has a hooked process at the middle of its lower edge.

♀. The clypeal margin is scarcely excised in the middle. The front tibia is broad, armed with four blunt external teeth and an articulated terminal spur.

Length, 15·5–21 mm.; breadth, 9–10·5 mm.

PUNJAB: Thobba, Murree Hills (*Maj. Howland Roberts*). U. PROV.: Suswa R. (*C. F. C. Beeson*, Nov.). CENTR. PROV.: Basha Ghat, Bergi (*H. S. Pruthi*, Dec.).

Type of *O. crassus* Shp. in M. Oberthür's collection; that of *vischnu* de Borre in the Brussels Museum.

Found in cattle-dung.

Genus **CHIRONITIS**.

Cheironitis Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 19.
Chironitis Reitt., Verh. Ver. Brünn, xxxi, 1894, p. 98.

TYPE, *Scarabæus furcifer* Rossi (Europe).

Range. S. and E. Europe, Africa, Asia.

Rather oblong in shape and rather depressed. Legs (except the front pair in the male) not long. Front tibia armed with four external teeth, middle and hind tibiæ strongly dilated at the extremity, the former with two, the latter with one terminal spur; middle and hind tarsi with progressively diminishing joints, the basal joint more than twice as long as the 2nd. Head not long, the ocular lobes projecting slightly and united by a carinate suture with the clypeus, of which the front margin is reflexed and excised. Pronotum

transverse, the base finely margined, with a small fovea on each side of the middle. Scutellum not very small, sharp-pointed. Elytra covering the abdomen and smooth or hairy at the extremity, with simple narrow epipleuræ. Front coxæ very large and prominent. Middle coxæ long, parallel, and far apart. Abdomen with a continuous carina around the sides and pygidium. Antennæ 9-jointed, all but the basal joint very short, the club very compact, the 7th joint cup-shaped, smooth and chitinous, enclosing the 8th, which, with the 9th, is spongy in texture. Mandible rather short. Maxilla with broad terminal lobe and rather short palpus. Labium and palpi thickly clothed with long bristles, ligula strongly bilobed, slightly chitinous, basal joint of palpus small, 2nd elongate, 3rd very small.

♂. The front legs are elongate, the femora armed with one or more sharp teeth at the front edge, the tibiæ slender, with four slight external teeth, the extremity produced, the tarsus and terminal spur wanting. Prosternum forming a narrow or broad 2-horned process behind the front coxæ.

♀. The front legs are stout, with broad tibiæ, armed with four strong teeth, not produced at the end, and bearing a very short tarsus and an articulated terminal spur. The pronotum is relatively shorter than that of the male.

The presence of front tarsi in the female and their absence in the male is the chief distinctive feature of this genus.

Key to the Species of Chironitis.

Brown, speckled; base of pronotum straight..	*indicus* Lansb., p. 402.
Entirely black; base of pronotum rounded ..	*osiridis* Reiche, p. 403.

341. **Chironitis indicus.** (Plate XII, figs. 15, 16.)

Cheironitis indicus Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 45.

Yellow, speckled with brown, the clypeus, ocular lobes, and lateral margins of the pronotum yellow, the head, pronotum, legs, and lower surface usually suffused with a slight metallic lustre.

Oblong and rather depressed, opaque, except upon the pale margins of the head and prothorax. The *clypeus* has the front margin strongly reflexed and feebly bilobed, and bears a short, transverse, posterior carina. It is separated from the forehead, which bears short erect setæ, by another carina. The *pronotum* is considerably broader than the elytra, unevenly rugose, with very irregular punctures, which are coarse and partly confluent in the middle, fine and sparse at the sides. The lateral margins are strongly dilated in the middle, convergent and nearly straight from there to the front and hind angles, of which the former are slightly and the latter strongly obtuse.

The base is straight and finely margined and the basal foveæ are narrow and converge a little forward. The *elytra* are very lightly striate, with the 2nd and 4th intervals broad and rather flat and the 3rd and 5th narrow, raised, and rather sharply carinate. The outer margins are gently sinuated just behind the shoulders, and the rounded posterior part is clothed with short erect setæ. The *pygidium* is lightly and sparsely punctured. The metasternal shield is longitudinally grooved and clothed with erect hairs anteriorly, very minutely and sparingly punctured posteriorly, and the sides of the *metasternum* and abdomen are clothed with fine pubescence.

♂. The clypeus is shining, finely and sparingly punctured, and the posterior carina feeble. The prosternum is produced behind the front coxæ into a long, narrow, oblique process, bifid at the end. The front femur bears a very strong sharp tooth near the end of its anterior edge, and the tibia is long and slender, strongly curved, produced at the end and armed with four small external teeth and one beyond the middle of its lower face.

♀. The clypeus is finely and rather closely granular, and the clypeo-frontal carina bears a sharp tubercle in the middle. The clypeal carina is rather strong. The front tibia is armed with four strong external teeth.

Length, 11·5 mm. ; breadth, 6–9 mm.

N. W. FRONTIER PROV. : Bannu (*Dr. Pennell*). SIND : Karachi. U. PROV. : Suswa R. (*C. F. C. Beeson*, Nov.). BOMBAY : Bombay (*L. Fea*, April) ; Belgaum (*H. E. Andrewes*). S. INDIA : Coimbatore (*M. J. Walhouse*) ; Madura (*C. Somers Smith*).

Type in the Brussels Museum.

Found in cattle-dung.

342. **Chironitis osiridis.** (Plate XII, figs. 17, 18.)

Onitis osiridis Reiche, Rev. Mag. Zool. 1856, p. 118.
Cheironitis osiridis Lansb., Ann. Soc. Ent. Belg. xviii, 1875, p. 25.

Entirely black, opaque above and shining beneath, with the antennæ reddish. The upper surface is without hairs or setæ.

Narrowly elongate, rather depressed. The *head* is short and broad, the *clypeus* transversely rugose, with the front margin strongly reflexed and bearing two blunt teeth rather far apart. The clypeus bears a very short transverse carina beyond the middle, and is divided from the forehead by a straight carina with a tubercle in the middle. The *pronotum* is irregularly rugose in front and asperately punctured behind. It is a little wider than the elytra, moderately dilated in the middle, with the front angles blunt, the hind angles quite obsolete, and the base curved and finely margined, the basal

foveæ converging slightly forward. The *elytra* are very lightly striate, with the 1st, 5th, and 7th intervals narrow and a little raised. The outer margins are very feebly sinuate just behind the shoulders. The *pygidium* is minutely and sparsely punctured. The metasternal shield is very smooth, except in the posterior part in the male, and the sides bear fine asperate punctures.

♂. The clypeo-frontal carina bears a very feeble tubercle in the middle. The prosternum is produced to a point directed outwards on each side behind the coxæ. The front legs are long, the femur bearing two strong sharp spines at the front edge and a ventral one directed downward, the tibia slender, produced and strongly curved at the end, armed with four short external teeth and bearing a finely serrate carina beneath.

♀. The clypeus is more finely rugose than that of the male, the clypeo-frontal carina bears a sharp tubercle in the middle, and the front tibia is armed with four strong sharp teeth.

Length, 11–15 mm. ; breadth, 6–8 mm.

BALUCHISTAN (*J. W. Evans*, July). SIND : Karachi. ARABIA. EGYPT. NUBIA.

Type unknown to me.

Division IV. PANELINI.

The genera comprised in this Division differ greatly in the form of the legs, but agree in being of very compact form, with the middle coxæ far apart and nearly parallel, and with quite simple tarsi, of which the first four joints are nearly equal in size.

There is no armature or marked sexual difference.

Two of the genera are composed of insects known to be myrmecophilous in their habits, and it is probable that others will also be found to live within the nests of ants or termites.

Key to the Genera of Panelini.

1	(4)	Hind tibiæ long.	
2	(3)	Posterior tibiæ and tarsi slender.	PANELUS Lew., p. 405.
3	(2)	Posterior tibiæ clavate and tarsi short	PONEROTROGUS Silv., p. 407.
4	(1)	Hind tibiæ very short and broad.	
5	(6)	Front tarsi slender	DELOPLEURUS Er., p. 409.
6	(5)	Front tarsi short.	
7	(10)	Body very short.	
8	(9)	Body not very smooth; posterior tibiæ not very flat	PYCNOPANELUS, gen. n., [p. 412.
9	(8)	Body very smooth; posterior tibiæ very flat	HAROLDIUS Bouc., p. 413.
10	(7)	Body elongate	PARAPHYTUS Har., p. 417.

Genus PANELUS.

Panelus Lewis, *Ann. Mag. Nat. Hist.* (6) xvi, 1895, p. 375.

TYPE, *Temnoplectron parvulum* Wat. (Japan).

Range. Japan, Indo-Malayan Region, Australia.

Very small and compact, with long and slender legs, the middle and hind tibiæ dilating little from base to extremity, the front tibia armed with three minute external teeth and finely serrate above and between them. Front tarsi extremely short, middle and hind tarsi rather long and slender, the joints of equal breadth, the 1st to 4th nearly equal in length and the 5th longer, the claws minute. Head flat, not very broad, the eyes not very small as seen from above, the clypeus bidentate at the front margin. Antennæ 9-jointed. Pronotum with well-marked hind angles, the lateral margins continuous with those of the elytra, the prothorax very deeply excavated in front beneath. Scutellum absent. Elytra not very short, with rather wide epipleuræ. Mesosternum not very short, separated by an angular line from the metasternum, the latter very long, broad between the middle coxæ, which are of moderate length.

The type species of *Panelus* was found in numbers under dead leaves in Japan. The Indian species probably live in similar conditions, but the habits of these minute members of the group remain to be discovered.

Key to the Species of Panelus.

1 (4) *Smooth and shining.*
2 (3) Pronotum finely punctured .... *assamensis* Arrow, p. 405.
3 (2) Pronotum strongly punctured .... *puncticollis*, sp. n., p. 406.
4 (1) Opaque and pubescent .... *setosus*, sp. n., p. 406.

343. Panelus assamensis.

Panelus assamensis Arrow, Ann. Mag. Nat. Hist. (7) xix, 1907, p. 417.

Pitchy-red, with the legs red and the club of the antenna black, and entirely smooth and shining above and beneath.

Oval and very convex. The *head* is very finely and closely punctured, except upon the *clypeus*, which is scarcely visibly punctured and is produced into two sharp terminal teeth not far apart. The *pronotum* is closely but a little less finely punctured, with a sharply defined broadly parabolic smooth area at the base. The basal margin is gently rounded and has a row of faint impressions, interrupted in the middle. The sides are nearly straight and parallel behind and strongly convergent in front. The *elytra* are very lightly and faintly

striate, with the intervals flat and very minutely irregularly punctured. The *meso-* and *metasternum* are very smooth, the former contracted in the middle by a triangular process of the metasternum. The latter bears in the middle straight lateral lines converging to this anterior process, and its sides bear very shallow punctures.

I have found no sexual difference.

Length, 2·5 mm. ; breadth, 1·5 mm.

ASSAM : Sadiya, Patkai Hills (*W. Doherty*).

Type in the British Museum.

344. Panelus puncticollis, sp. n.

Black, smooth and shining, with the legs and antennal foot-stalk dark red, and with excessively minute scanty pale setæ upon the upper surface.

Broadly oval and very convex. The *head* is very finely and rather sparingly punctured, with the eyes moderately large and the *clypeus* produced into two sharp teeth not far apart. The *pronotum* is strongly and rather closely punctured, with a small, approximately triangular, ill-defined, smooth area at the base. The base is gently rounded and bears a single marginal row of punctures. The sides are nearly straight and parallel behind, rather abruptly bent and convergent in front. The *elytra* are finely striate, with the intervals flat, and bear only very scanty minute setigerous punctures. The *pygidium* is rather rugosely and coarsely punctured. The *metasternum* bears shallow elongate punctures at the sides and is very smooth in the middle, with very sparse minute punctures. The *mesosternum* is smooth and divided by a curved line from the metasternum.

Length, 2·5 mm. ; breadth, 1·5 mm.

CEYLON : Kandy (*G. E. Bryant*, June).

Type in the British Museum.

345. Panelus setosus, sp. n.

Black, with the head and pronotum coppery, the tibiæ and tarsi deep red and the upper surface fairly closely clothed with very short hooked greyish setæ.

Ovate, very convex, with the hind tibiæ bisinuate. The *head* and *pronotum* are closely and very strongly punctured, the *clypeus* produced into two sharp teeth not very close together, and the junction of the clypeus and ocular lobe on each side is also minutely but acutely toothed. The front angles of the pronotum are flattened and the dorsal part very strongly elevated and rounded. The punctures are elongate and very deep, except in the basal part, where they form large

shallow pits. The sides are parallel, abruptly angulate in front, where they are bent almost at right angles, the front angles are acute, the hind angles obtuse, and the base gently rounded. The elytral striæ consist of chains of large shallow punctures, and the intervals are slightly convex, smooth, and shining. The *pygidium* is opaque and bears a sharp longitudinal median carina and fine annular punctures. The *meso-* and *metasternum* are divided by a deeply incised transverse groove, the mesosternum bears large annular punctures, the metasternum is very smooth in front and finely and

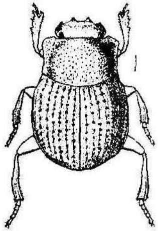

Fig. 56.—*Panelus setosus.*

sparingly punctured behind, and the sides bear moderately close annular punctures.

Length, 3 mm.; breadth, 1·5 mm.

CEYLON: Kandy (*G. E. Bryant*, June).

Type in the British Museum.

The type is unique.

The front tibiæ are rather broader than those of the related species, and there are rather strong intermediate teeth between the three primary ones. The clothing of short setæ and the strongly raised dorsal part of the thorax give this little insect a quite peculiar appearance.

Genus PONEROTROGUS.

Ponerotrogus Silv., Rec. Ind. Mus. xxvi, 1924, p. 583.

TYPE, *P. annandalei* Silv.

Range. Southern India.

Small, hemispherical, extremely compact, with rather short legs, the tibiæ flat and very broad at the ends, the tarsi very short and compact. Head very short and broad, the clypeus

completely fused with the ocular lobes, notched and bidentate in the middle of the front margin, the eyes very small as seen from above. Pronotum very short, with the front margin slightly prominent in the middle, the lateral margins nearly straight, the front angles rounded, the hind angles sharp and the base rounded, with a very obtuse angle in the middle. Scutellum absent. Elytra very short and rounded, with broad abrupt epipleuræ containing hollows to receive the extremities of the middle and hind femora. Prothorax hollowed beneath the front angles. Prosternum longitudinally carinate behind in the middle. Mesosternum long, divided by a nearly semicircular line from the metasternum. Middle coxæ widely separated and very oblique. Abdomen with five short sternites and the 6th longer; pygidinm small. Femora rather flat, not broad, moderately long, the middle and hind pairs extending beyond the sides of the body. Front tibia very broad, with two minute external teeth close to the extremity. Middle and hind tibiæ slender at the base, dilating gradually, and very broad and rounded at the ends, with the margins simple, not toothed, the extremities clothed with short hairs. Tarsi very short and compact, with the four basal joints nearly equal, the 1st rather shorter than the 2nd and the claws minute. Antennæ 8-jointed. Maxillæ rather long, with slender palpi. Mentum excised at the front margin, the labial palpi far apart, with the 2nd joint about as broad as it is long and the terminal joint minute and narrow.

346. Ponerotrogus annandalei.

Ponerotrogus annandalei Silv.,* Rec. Ind. Mus. xxvi, 1924, p. 586.

Black, extremely smooth and shining, with the head and pronotum feebly coppery and the antennæ and legs red. The *head* and *pronotum* are minutely and unevenly punctured, the former with rather larger punctures intermixed, the latter fairly closely punctured upon the anterior half and very sparsely upon the posterior half. The anterior angles are very broadly rounded, the posterior angles obtuse but well marked, and the basal margin obtusely angular in the middle, with about eight or nine minute notches rather close together on each side of the angle. The *elytra* are extremely finely striate, with the intervals quite flat and scarcely perceptibly punctured. The *pygidium* is very convex, smooth and shining, and scarcely perceptibly punctured. The *mesosternum* is subopaque. The *metasternum* is very smooth and shining, its anterior margin semicircularly rounded in the middle. The *abdomen* is very short, with its last sternite longer than the rest and distinctly punctured.

Length, 3·3 mm.; breadth, 2·5 mm.

MADRAS : Barkuda I., L. Chilka (*N. Annandale*, Aug. and Oct.) ; Coimbatore (*M. J. Walhouse*).

Type in the Calcutta Museum ; co-type in the British Museum.

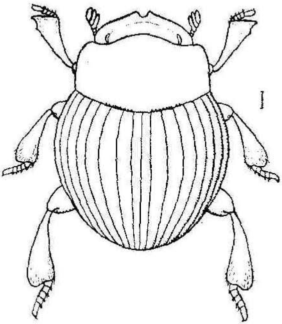

Fig. 57.—*Ponerotrogus annandalei.*

Several specimens were found by the late Dr. Annandale in the nest of an ant, *Ponera tesserinoda*, beneath stones.

Genus DELOPLEURUS.

Delopleurus Er., Naturg. Ins. Deutschl. i, 3, 1848, p. 761.

TYPE, *D. pullus* Boh. (South Africa).

Range. South Africa and India.

Very short, broad and compact, with very short legs, the front tibia very broad, with three stout external teeth, and excavated beneath at the base of the tarsus, allowing the latter to be folded backward. Front tarsi long and filiform. Middle and hind tibiæ triangular, very broad at the extremity, the tarsi short, the first four joints about as long as broad, very slightly diminishing from 1st to 4th, the last a little longer, and the claws fairly slender. Head short and broad, flat, with the clypeus armed with four teeth at the anterior margin and not separated from the forehead, the ocular lobes slightly dentate in front, the eyes (seen from above) very small. Pronotum very short, deeply excised behind the head, with the front angles rounded, the lateral margins angulate before the middle, the base straight in the middle.

Scutellum wanting. Elytra very convex, with the outer margins deeply sinuate a little behind the shoulders, the epipleuræ indistinct. Pygidium small, with reflexed ventral face. Front angles of the prothorax deeply hollowed beneath. Mesosternum very wide, with the front and hind margins straight and parallel. Middle coxæ not long, very far apart. Metasternum short. Abdomen very short. Antennæ 8-jointed. Labrum rounded in front, with a median marginal tooth. Mandible short and pointed, the fringed basal part sharply separated from the terminal part. Maxilla long, with narrow terminal lobes. Mentum transverse, with convergent sides, the palpi short and compact, the three joints similar, short, broad and closely articulated.

The curious little insects belonging to this genus, though apparently rare in India, are fairly common in South Africa. From their peculiar appearance, which suggests that of the quite unrelated Histeridæ, they seem to have some way of life unlike that of their allies. They may be easily recognized by the four clypeal teeth, very short stout legs, the sinuation of the outer margins of the elytra, as in the genus *Gymnopleurus*, and the inwardly bent pygidium.

Key to the Species of Delopleurus.

Elytra with large and conspicuous punctures far apart .... *parvus* Sharp, p. 410.
Elytra with minute and inconspicuous punctures .... *striatus*, sp. n., p. 411.

347. Delopleurus parvus.

Coptorrhina parva Sharp, Col. Hefte, xiii, 1875, p. 47.

Shining black above and beneath, with the antennæ and mouth-organs red, the antennal club yellow, and with extremely scanty fine setæ beneath, the upper surface entirely smooth.

Subquadrate in shape and highly convex. The *head* is densely and rugosely punctured, especially in front, the *pronotum* closely at the sides, the punctures becoming regularly finer and scantier towards the middle, where they are almost absent. The front angles are rounded, the lateral margins gently rounded in front and feebly sinuate behind, the base feebly rounded, almost straight in the middle, the basal margin with a series of minute notches placed rather close together. Near the base there is a short median stria extending about a quarter of the length of the pronotum. The *elytra* are finely striate, the striæ with very strong widely spaced punctures, and the outer margin has a deep angular sinuation a little behind the shoulder. The *pygidium* is reflexed ventrally

and strongly transverse, with its surface smooth and hollowed except for an abruptly raised margin. The *mesosternum* and metasternal shield are smooth and unpunctured, and the sides of the *metasternum* are shallowly and fairly closely pitted.

The two sexes appear to be alike.

Length, 5–6 mm. ; breadth, 3–4 mm.

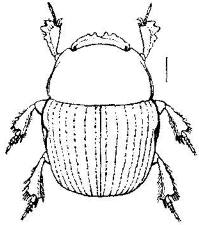

Fig. 58.—*Delopleurus parvus.*

BENGAL : Baripada, Mourbhanj (*H. Maxwell Lefroy*, Aug.).
S. INDIA : Coimbatore (*M. J. Walhouse*) ; Malabar.

Type in M. René Oberthür's collection.

The large distant punctures in the elytral striæ are very distinctive of this species.

348. **Delopleurus striatus**, sp. n.

Black, smooth and shining, with dark reddish legs and orange antennal club.

Broadly oval, compact, and very convex. The *head* is densely and rather rugosely punctured in front and finely but not very closely behind. The *pronotum* is finely margined all round, except in the middle of the base, and the base has also a row of equidistant minute and shallow marginal punctures. The surface of the pronotum is unequally but rather closely punctured, except near the base, most strongly and closely at the sides, and there is a deep short longitudinal stria at the middle of the base. The front angles are blunt, the sides curved in front and nearly straight behind, with feebly indicated posterior angles. Each *elytron* bears seven distinct and well impressed striæ, and an eighth which is cut short anteriorly by the sinuation of the lateral margin. The striæ bear fine, scanty and not very distinct punctures.

The *pygidium* is rather short, smooth and shining, with a narrow strongly raised margin all round. The *meso-* and *metasternum* are smooth in the middle and the latter is fairly strongly but not closely punctured at the sides.

Length, 5 mm.; breadth, 3·5 mm.

U. PROV.: Dehra Dun, 2000 ft. (*H. G. Champion*, Aug.).

PYCNOPANELUS, gen. n.

Broad, compact, and convex, with the legs rather short and stout, but the front tibiæ longer than the middle ones. Head rather flat, without transverse suture or ridge, the clypeus not separate from the forehead, short but a little narrowed in front, where it forms two blunt and not deeply divided lobes. Prothorax rather parallel-sided behind, deeply hollowed beneath the front angles. Middle coxæ short and far apart, the meso-metasternal line gently curved. Scutellum absent. Elytra with conjointly rounded outline, the epipleuræ very narrow. Femora stout, especially the hind pair, which are broadest towards the end. Front tibia moderately long, with three short but fairly sharp external teeth, occupying less than half the outer edge, the remainder of which is serrate, the extremity produced internally and sharply incurved. Middle tibia very short, strongly dilating from base to extremity, which is oblique. Hind tibia strongly curved, a little twisted, dilating (but not evenly) towards the end, where it is narrowed and produced internally as a straight pointed process. Front tarsi short, middle and hind tarsi rather broad, the basal joint not much longer than the succeeding one. Pygidium perpendicular, convex.

The only known specimen of this little insect is apparently a male, and it is likely that the legs of the female, and especially the front tibiæ, will be found to be of rather different shape.

349. Pycnopanelus rotundus, sp. n.

Black and shining, with the tarsi dark red, and the surface above and beneath bearing minute and rather scanty white setæ, and the four posterior tibiæ long yellow bristles.

Very short, compact and convex. The *head* is rugose in front and strongly and closely punctured behind, the sides strongly rounded and the *clypeus* bluntly bilobed. The *pronotum* is rather strongly and evenly, but not closely, punctured. The sides are strongly angulate, nearly straight before and behind the angulation, with the front angles rather, and the hind angles very, blunt and the base strongly and evenly rounded. The *elytra* are finely striate, with the intervals

flat and sparingly but distinctly punctured. The *pygidium* is shining, coarsely punctured at the base, finely and sparsely towards the apex. The metasternal shield is finely and rather evenly punctured, and the sides of the *metasternum* bear large annular punctures.

Length, 3 mm. ; breadth, 2·5 mm.

MADRAS.

Type in the British Museum.

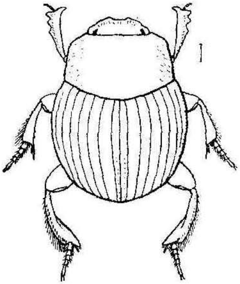

Fig. 59.—*Pycnopanelus rotundus.*

The unique representative of this species was acquired with the Pascoe collection, and bears no record except the word "Madras."

Genus **HAROLDIUS.**

Haroldius Bouc., Ann. Soc. Ent. France, 1914, p. 253.
Cyclotrogus Wasm., Wien. Ent. Zeit. xxxvi, 1918, p. 2.

TYPE, *H. rugatulus* Bouc. (Singapore).

Range. The Indo-Malayan Region.

Very small, hemispherical, with extremely short and broad legs. Head very short and broad, very prominent laterally before the eyes, which are very small as seen from above. Clypeus completely fused with the ocular lobes, notched and bidentate in the middle of the front margin and rounded at the sides. Pronotum short, with the lateral margins straight and convergent, the front angles rounded, the hind angles sharp, right-angled, the base gently curved and not margined. Scutellum wanting. Elytra with seven fine striæ and wide epipleuræ. Pygidium short. Prothorax

hollowed beneath the front angles. Mesosternum short, separated by a raised semicircular line from the metasternum, which is not long. Abdomen with five short sternites, the 6th longer. Middle coxæ oblique and widely separated. Femora short, broad and flat, not reaching the sides of the elytra. Front tibia very short and broad, truncate at the end, with two minute teeth close together externally. Middle and hind tibiæ extremely short and broad, folding beneath the femora, the inner and outer margins evenly curved, not toothed or fringed, the outer extremities acutely produced. All the tarsi very short and compact, the front pair not much shorter than the rest, the basal joint extremely short, the claws very minute. Antennæ 8-jointed, with a rather large club.

Key to the Species of Haroldius.

1 (2)	Pronotum without triangular basal area.	*cardoni* Bouc., p. 414.
2 (1)	Pronotum with triangular basal area.	
3 (4)	Sides of the pronotum obliquely striate.	*heimi* Wasm., p. 415.
4 (3)	Sides of the pronotum strongly punctured..........................	*stevensi*, sp. n., p. 416.

350. **Haroldius cardoni.**

Haroldius cardoni Bouc., Bull. Mus. Hist. Nat. Paris, 1923, p. 83.

" Short, orbicular, black, with the head and thorax coppery, the pygidium, last abdominal segment and legs reddish, inconspicuously clothed above with short, scanty and very minute erect hairs in rows upon the elytra ; *head* smooth, with the forehead convex, the *clypeus* slightly hollowed, rounded and bidentate in front, and the eyes minute. *Prothorax* shining, minutely punctulate behind the head, smooth elsewhere, the sides straight and convergent, the front angles obliquely depressed, the base very obtusely angulate, not margined. *Elytra* opaque, almost hemispherical, with very fine unpunctured striæ, the outermost sinuate at the shoulder, the intervals flat, smooth, but their lateral part marked with very minute, hardly visible setigerous punctures in single rows, the epipleuræ very wide, impressed to receive the middle femora. *Pygidium* transverse, almost smooth. *Metasternum* separated by a barely visible semicircular line from the *mesosternum*, the latter finely striolate. Metasternum smooth, not sulcate, convex, tectiform in front. Hind femora and tibiæ bimarginate beneath, the latter clavate, lenticular in section, with the extremities rounded and furnished with a brush of yellow hairs before the tarsi, minutely and sparsely punctulate and pilose. Tarsi short, with nearly equal joints scarcely decreasing in width, ciliate above."

Length, 3 mm.

CHOTA NAGPUR : Nowatoli (*Father Cardon*).
Type in the Paris Museum.

"This species is remarkable for the extreme fineness of its pubescence, its scanty puncturation, and its striæ: the oblique depressions of the anterior angles of the thorax produce the illusion that this part is auriculate; the series of punctures upon the elytral intervals is placed, not in the middle, but near the outer stria of each interval."

I have translated M. Boucomont's description of this species, which I do not know.

351. **Haroldius heimi.**

Cyclotrogus heimi Wasm.,* Wien. Ent. Zeit. xxxvii, 1918, p. 4, pl. 1, fig. 1.
Cyclotrogus nigrita Wasm.,* l. c.

Shining black, with the legs, antennæ, mouth-organs, the front of the head, sides of the pronotum, shoulders, and apices of the elytra red, or entirely red.

Very broadly oval, highly convex, almost hemispherical, extremely smooth. The *head* is flat, extremely finely and sparsely punctured in front and a little less so behind, the clypeal margin gently reflexed and minutely and acutely bidentate in the middle. The sides of the *pronotum* for about a quarter of its width on each side bear fine and moderately close oblique striæ, except near the front angles, where the surface is smooth, and the dorsal surface is very finely and fairly closely punctured, like the posterior part of the head, with the exception of a small rather triangular area in the middle of the base, which is smooth and feebly depressed. This area is limited at the sides by a few larger punctures, which are continued along the extreme basal margin on each side. The *elytra* bear very fine simple striæ, and the intervals are flat and bear extremely minute scattered punctures. The *pygidium* is convex and smooth, sparingly but a little more strongly punctured than the elytra. The *metasternum* is very finely and sparsely punctured in the middle and a little more strongly at the sides.

Length, 2·5–3 mm.; breadth, 2 mm.

BOMBAY : Wallon, Ahmednagar Dist. (*P. J. B. Heim*).
Types in St. Ignatius College, Valkenburg, Holland.

The two specimens, which are all as yet known of this species, were found with the ant, *Pheidole latinoda*, one in 1898 and the second in 1901. They have been very kindly sent to me for examination by the late Father Wasmann, who regarded them as representing two species; but, after a careful comparison, I have come to the conclusion that they belong to the same species and that the slight differences observed by him

are individual only. The very peculiar sculpture of the pronotum should render it easy to recognize this little insect, in spite of its minute size.

352. **Haroldius stevensi**, sp. n.

Black and shining, with the legs, antennæ, mouth-organs and front of the head red.

Very broadly oval, highly convex. The *head* is rather flat, very finely and sparsely punctured in front, and a little more strongly behind, the clypeal margin feebly reflexed and sharply bidentate in the middle. The *pronotum* is fairly closely punctured, the punctures moderately fine in front and becoming rather larger and more or less oval in shape behind. At the basal margin there is a series of fine notches

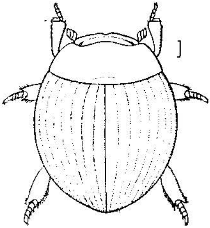

Fig. 60.—*Haroldius stevensi.*

on each side. In the middle of the basal part there is a sharply defined transversely elliptical area quite free from punctures, but rough and opaque anteriorly. The *elytra* bear very fine simple striæ and the intervals bear extremely minute scattered punctures. The *pygidium* is smooth, minutely punctured, and a little inturned. The *mesosternum* is coarsely punctured, the metasternal shield is semicircular and a little hollowed in front, smooth in the middle and finely punctured at the sides, and the sides of the *metasternum* are strongly and closely strigose.

Length, 3·5 mm.; breadth, 2·5 mm.

Bengal: Gopaldhara, Rungbong Valley, Darjeeling Dist., 4720–6000 ft. (*H. Stevens*, Sept.).

Type in the British Museum.

The type is unique, and was presented by the discoverer, Mr. H. Stevens.

This species nearly resembles *H. heimi*, but is rather larger, with tibiæ which, although of the same peculiar shape, are rather less broad than in that species. The shape of the body is almost identical, but the sculpture of the pronotum is quite different. The oblique scratches are absent and the surface is closely punctured instead, the punctures being a little stronger in the middle than at the sides. At the base of the median part, however, as in *H. heimi*, there is a rather triangular unpunctured area, larger and better defined than in the other species, but roughened in its anterior part. The chain of large punctures seen in *H. heimi* is wanting. The elytra are still more finely punctured.

Genus **PARAPHYTUS.**

Paraphytus Har., Ann. Mus. Civ. Genova, x, 1877, p. 42.
Xynophron Har., Notes Leyd. Mus. ii, 1880, p. 199.
Maraxes Lewis, Ann. Mag. Nat. Hist. (6) xvi, 1895, p. 376; op. cit. (8) iv, 1909, p. 304.

TYPE, *P. doriæ* Har. (Borneo and Sumatra).

Range. The Indo-Malayan Region and Japan.

Elongate and not very convex, with very short stout legs, the tibiæ short and flat, dilating strongly from base to extremity, the tarsi short, with the basal joint very short, the 2nd, 3rd, and 4th scarcely longer, the 5th a little longer and the claws minute, the front tarsi rather shorter than the rest and received in a groove at the apical edge of the tibia. Head short and broad, the ocular lobes completely fused with the clypeus, strongly angulate externally, the clypeus armed with four short teeth at the front margin. Prothorax short and broad, with the sides nearly straight, the angles blunt and the base feebly curved. Scutellum wanting. Elytra relatively long, with seven dorsal striæ and well-marked epipleuræ. Pygidium broad and reflexed ventrally. Abdomen with five very short sternites, the 6th longer. Prothorax deeply hollowed beneath the front angles. Mesosternum short and concealed by the prosternum. Metasternum long, not very broad between the middle coxæ, which are slightly oblique. Antennæ 9-jointed. Mandible long and narrow. Maxilla narrow, with the terminal lobe small and the palpus long.

Key to the Species of Paraphytus.

Very elongate; very shining above .... *hindu* Arrow, p. 418.
Not very elongate; subopaque above ...... *andamanus*, sp. n., [p. 419.

353. Paraphytus hindu.

Paraphytus hindu Arrow, Ind. Mus. Records, viii, 1913, p. 193.

Shining black, with the antennæ, tarsi, and mouth-organs deep red.

Oblong and moderately convex. The *head* is broad, finely and densely punctured and a little depressed along the middle line. The *pronotum* is strongly and very closely punctured at the sides and a little more finely and less closely in the middle. The *elytra* are finely but deeply striate and the striæ bear rather close, deep, and regular punctures. The intervals are nearly flat and very minutely and sparingly punctured. The *pygidium* has a very deep transverse groove at the base and another at the apex, which is angularly

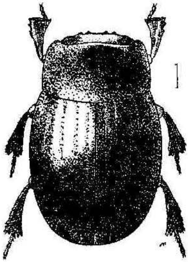

Fig. 61.—*Paraphytus hindu.*

indented in the middle. The *prosternum*, pro-episterna, *mesosternum*, and sides of the *metasternum* are closely and evenly punctured, and the metasternum is very smooth in the middle anteriorly and finely and sparingly punctured posteriorly.

♂. The pygidium is scarcely punctured, the basal groove is very deep and expands in the middle into a large round cavity. The apical groove is not very deeply indented in the middle.

♀. The pygidium is evenly punctured, its basal groove is not conspicuously enlarged in the middle, and the apical groove is very deeply indented.

Length, 5–5·5 mm.; breadth, 3 mm.

ASSAM: Upper Rotung, Abor Country (*S. Kemp*, Jan.); Khasi Hills (July).

Type in the British Museum.

Dr. Stanley Kemp found specimens of this insect beneath the bark of trees.

354. **Paraphytus andamanus**, sp. n.

Black, not very shining, with the antennæ pale.

Rather short and broad. The *head* is a little less broad than that of *P. hindu*, rather strongly and closely punctured and flat, without median depression. The *pronotum* is very coarsely and closely punctured, the punctures a little smaller at the front and side margins. The front angles are broadly rounded, the sides nearly straight, and the hind angles obtuse, and the base is gently rounded. The *elytra* are finely but deeply striate, the intervals flat and fairly closely and not very finely punctured. The *pygidium* is shining, finely and not closely punctured, with a deep and broad basal groove and a deep narrow apical one deeply indented in the middle. The entire lower surface is very strongly and deeply punctured, the punctures rather larger and closer at the sides than in the middle.

The unique specimen is probably a male.

Length, 5 mm.; breadth, 3·5 mm.

ANDAMAN IS. (*Roepstorff*).

Type in the British Museum.

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PLATE I.

Fig. 1. *Onitis humerosus* Pall., male, p. 390.
2. *Phalops divisus* Wied., male, p. 135.
3. *Onthophagus beesoni* sp. n., male, p. 319.
4. *O. igneus* Vigors, male, p. 198.
5. *O. unifasciatus* F., p. 341.
6. *O. vividus* Arrow, p. 245.
7. *O. fasciatus* Bouc., male, p. 311.
8. *O. regalis* Arrow, p. 186.
9. *O. cæruleicollis* Arrow, male, p. 185.
10. *Liatongus rhadamistus* F., male, p. 374.
11. *Onthophagus pactolus* F., male, p. 203.
12. *O. pygmæus* Schall., male, p. 210.

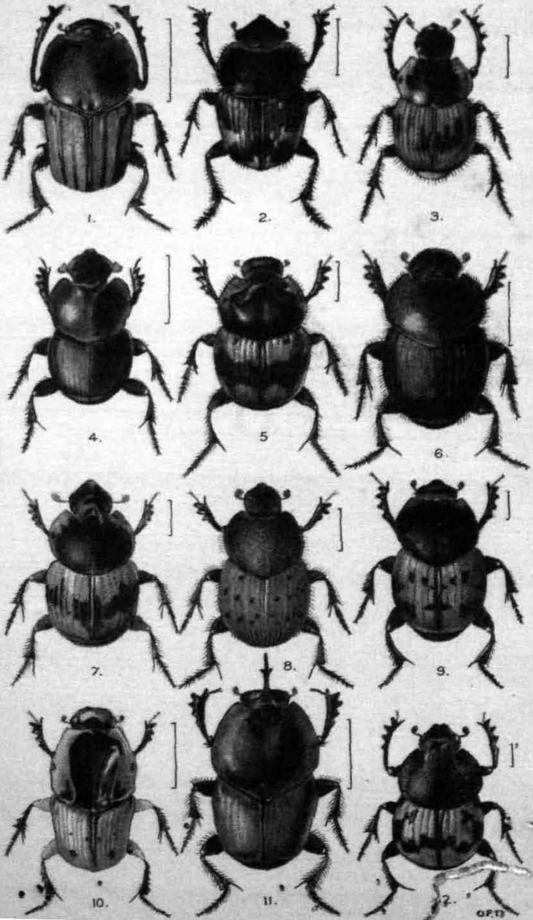
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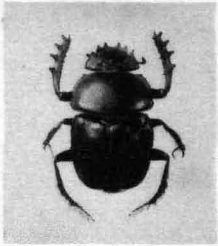
PLATE II.

Fig. 1. *Scarabæus andrewesi* Felsche, p. 43.
2. *S. devotus* Redt., p. 44.
3. *S. brahminus* Cast., p. 42.
4. *S. gangeticus* Cast., p. 41.
5. *S. cristatus* F., p. 42.
6. *S. erichsoni* Har., p. 45.
7. *S. sacer* L., p. 40.



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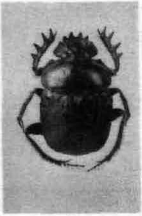

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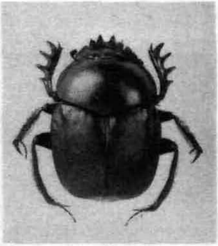

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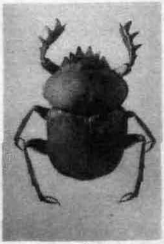

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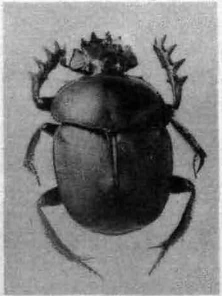

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PLATE III.

Fig. 1. *Gymnopleurus gemmatus* Har., p. 53.
2. *G. parvus* Macl., p. 52.
3. *G. miliaris* F., p. 50.
4. *G. koenigi* F., p. 51.
5. *G. flagellatus* F., p. 55.
6. *G. cyaneus* F., p. 49.
7. *G. bombayensis*, sp. n., p. 65.
8. *G. spilotus* Macl., p. 55.
9. *G. æthiops* Sharp, p. 62.
10. *Sisyphus tarantula* Arrow, p. 69.
11. *Gymnopleurus dejeani* Cast., p. 59.
12. *G. sinuatus* Oliv., p. 63.
13. *G. smaragdifer* Walk., p. 60.
14. *G. sumptuosus* Cast., p. 61.

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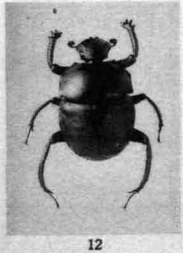
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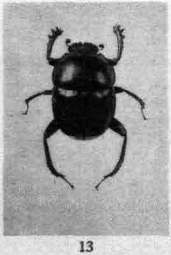
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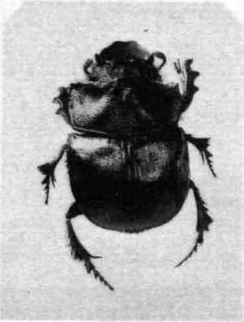
PLATE IV.

Fig. 1. *Heliocopris gigas* L., four-horned male, p. 86.
2. ,, ,, hornless male.
3. ,, ,, large male.
4. ,, ,, female.



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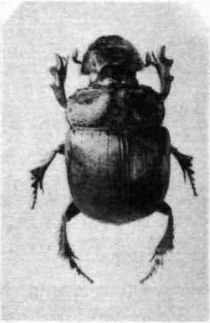

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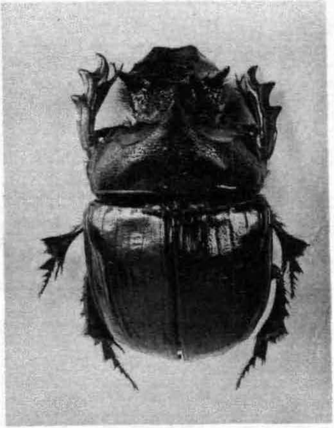
PLATE V.

Fig. 1. *Heliocopris dominus* Bates, male, type, p. 90.
2. *H. bucephalus* F., male, p. 88.
3. ,, ,, female.



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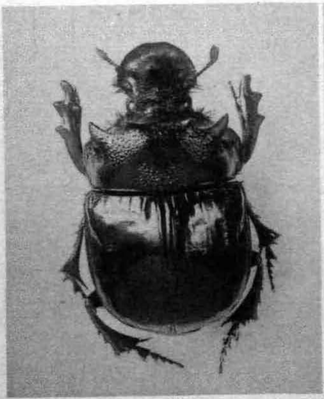

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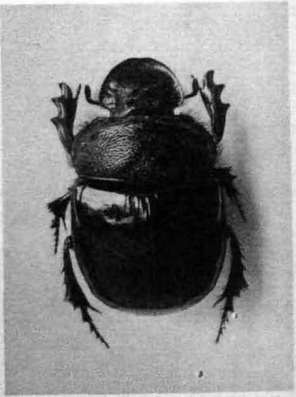

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PLATE VI.

Fig. 1. *Heliocopris tyrannus* Thoms., male, p. 87.

2. ,, ,, female.

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PLATE VII.

Fig. 1. *Catharsius pithecius* F., male, p. 100.
2. ,, ,, female.
3. *C. quadridentatus* Lansb., male, p. 98.
4. ,, ,, female.
5. *C. capucinus* F., male, p. 99.
6. ,, ,, female.
7. *Synapsis birmanicus* Gill., type, p. 83.
8. *S. tridens* Sharp, type, p. 81.
9. *S. brahminus* Hope, p. 82.
10. *S. gilleti*, sp. n., type, p. 83.

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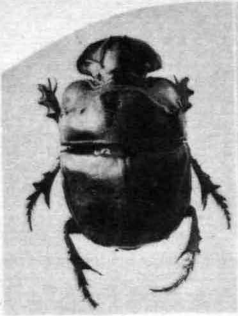
PLATE VIII.

Fig. 1. *Catharsius platypus* Sharp, male, p. 93.
2. ,, ,, female.
3. *C. sagax* Quens., male, p. 96.
4. *C. birmanensis* Lansb., male, p. 97.
5. ,, ,, female.
6. *C. molossus* L., male, p. 94.
7. ,, ,, female.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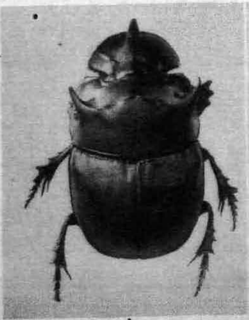
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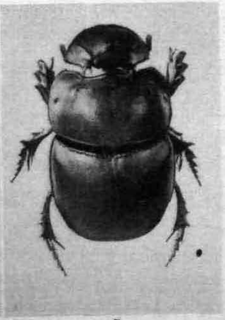
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PLATE IX.

Fig. 1. *Copris sarpedon* Har., male, p. 110.
2. ,, ,, female.
3. *C. sabinus* Gill., male, p. 105.
4. ,, ,, female.
5. *C. sinicus* Hope, male, p. 115.
6. ,, ,, female.
7. *C. repertus* Walk., male, p. 116.
8. ,, ,, female.
9. *C. iris* Sharp, male, p. 108.
10. ,, ,, female.
11. *C. magicus* Har., male, p. 112.
12. ,, ,, female.
13. *C. hispanus* L., male, p. 107.
14. ,, ,, female.
15. *C. sacontala* Redt., male, p. 104.
16. ,, ,, female.

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PLATE X.

Fig. 1. *Copris ramosiceps* Gill., p. 128.
2. *C. anomiopseoides* Bouc., p. 133.
3. *C. imitans* Felsche, p. 124.
4. *C. indicus* Gill., male, p. 106.
5. ,, ,, female.
6. *C. davisoni* Wat., male, p. 132.
7. ,, ,, female.
8. *C. punctulatus* Wied., male, p. 126.
9. ,, ,, female.
10. *C. signatus* Walk., male, p. 131.
11. ,, ,, female.
12. *C. corpulentus* Gill., male, p. 118.
13. ,, ,, female.
14. *C. numa* Lansb., p. 121.
15. *C. iris* Sharp, large male, p. 108.
16. ,, ,, small male.
17. ,, ,, female.

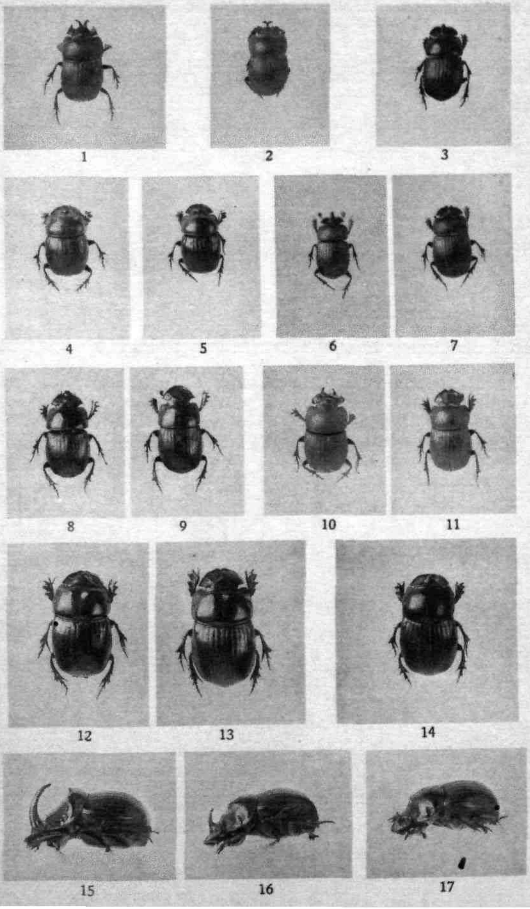
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PLATE XI.

Fig. 1. *Onitis crassus* Sharp, male, p. 400.
2. ,, ,, female.
3. *O. philemon* F., male, p. 393.
4. ,, ,, female.
5. *O. singhalensis* Lansb., male, p. 394.
6. ,, ,, female.
7. *O. castaneus* Redt., male, p. 398.
8. ,, ,, female.
9. *O. falcatus* Wulf., male, p. 392.
10. ,, ,, female.
11. *O. lama* Lansb., male, p. 389.
12. ,, ,, female.
13. *O. siva* Gill., male, p. 388.
14. ,, ,, female.
15. *O. brahma* Lansb., male, p. 399.
16. ,, ,, female.

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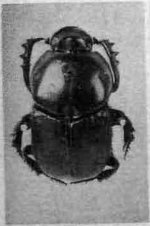
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PLATE XII.

Fig. 1. *Liatongus vertagus* F., female, lateral view, p. 371.
2. ,, ,, male, lateral view.
3. ,, ,, male, dorsal view.
4. *Onthophagus sagittarius* F., female, lateral view, p. 304.
5. ,, ,, male, lateral view.
6. *O. ramosus* Wied., male, p. 236.
7. ,, ,, female.
8. *O. discedens* Sharp, p. 259.
9. *O. productus* Arrow, male, p. 228.
10. ,, ,, female.
11. *Liatongus gagatinus* Hope, male, p. 365.
12. ,, ,, female.
13. *Onthophagus gagates* Hope, male, p. 277.
14. ,, ,, female.
15. *Chironitis indicus* Lansb., male, p. 402.
16. ,, ,, female.
17. *C. osiridis* Reiche, male, p. 403.
18. ,, ,, female.
19. *Onitis excavatus*, sp. n., male, p. 391.
20. *O. virens* Lansb., male, p. 396.
21. ,, ,, female.

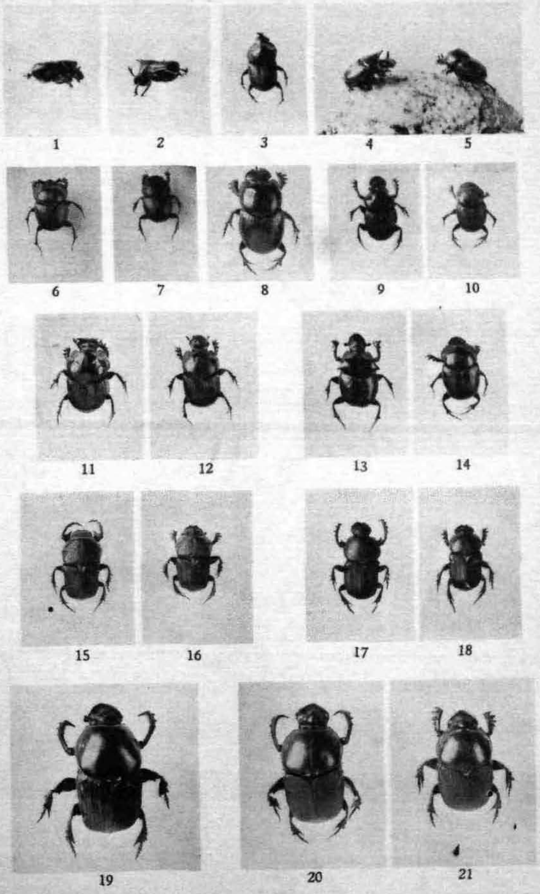
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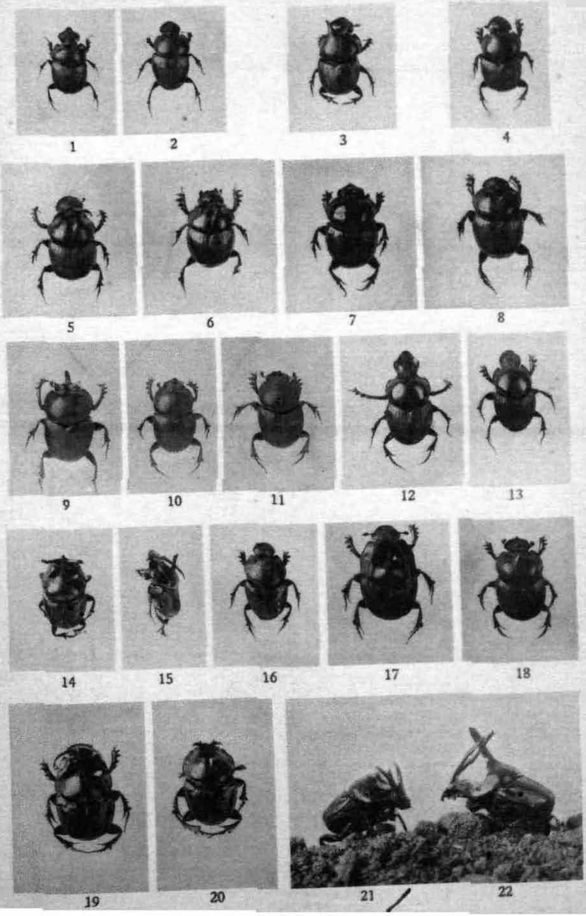
PLATE XIII.

Fig. 1. *Onthophagus ephippioderus* Arrow, male, p. 290.
2. ,, ,, female.
3. *O. seniculus* F., male, p. 235.
4. ,, ,, female.
5. *O. bonasus* F., male, p. 231.
6. ,, ,, female.
7. *O. manipurensis* Arrow, male, p. 242.
8. ,, ,, female.
9. *O. anguliceps* Bouc., large male, p. 178.
10. ,, ,, small male.
11. ,, ,, female.
12. *O. aviculus*, sp. n., male, p. 179.
13. ,, female.
14. *O. amplexus* Sharp, male, p. 238.
15. ,, ,, male, lateral view.
16. ,, ,, female.
17. *O. gladiator* Arrow, male, p. 175.
18. *O. tricornis* Wied., p. 198.
19. *O. imperator* Cast., male, p. 174.
20. ,, ,, female.
21. ,, ,, female, lateral view.
22. ,, ,, male, lateral view.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